

Vol. V

No. 3

MARCH, 1969

AGRICULTURAL CHEMICALS

This Issue:

Fertilizer Manufacturers
Reply to FTC Charges

Use of Insecticides in
Control of Weeds
Feeds

New Midwest Fertilizer
Plant Features Granular
Product

Need for Wide Selection
of Insecticides Voiced
at FDA Hearings

Potash, an All-American
Institution . . . Good
Editorial

Review of 1969 insect
infestations in U. S.





*Found
in a
desk
drawer...*

2,4-D AND INFC WEED KILLERS
DDT POWDERS AND LIQUIDS
BOTANICALS • ROTENONE • SABADILLA
PYRETHRUM POWDERS AND EXTRACTS
STIMTOX A
CHLORDANE POWDERS AND LIQUIDS
BHC POWDERS AND LIQUIDS
COTTON DUST CONCENTRATES
TOXAPHENE POWDERS AND LIQUIDS
TETRAETHYL PYROPHOSPHATE
ANTU
AEROSOL FORMULATIONS
PYRESCENTS (insecticide perfumes)
PYRINS
PIPERONYL BUTOXIDE CONCENTRATES

They were 'way in the back, these early samples of some of the first Cube roots imported into this country.

These particular ones are called *Barbasco*.

Their age reminded us that we were *pioneers* in the processing of rotenone, one of the earliest of the safe insecticides. We were selecting and grinding rotenone-bearing roots—Derris, Timbo, and Barbasco—almost two decades ago. Today we, and you, profit by that background of experience.

To be *sure* of the best in Cube—when you need it...look to *Powell!*



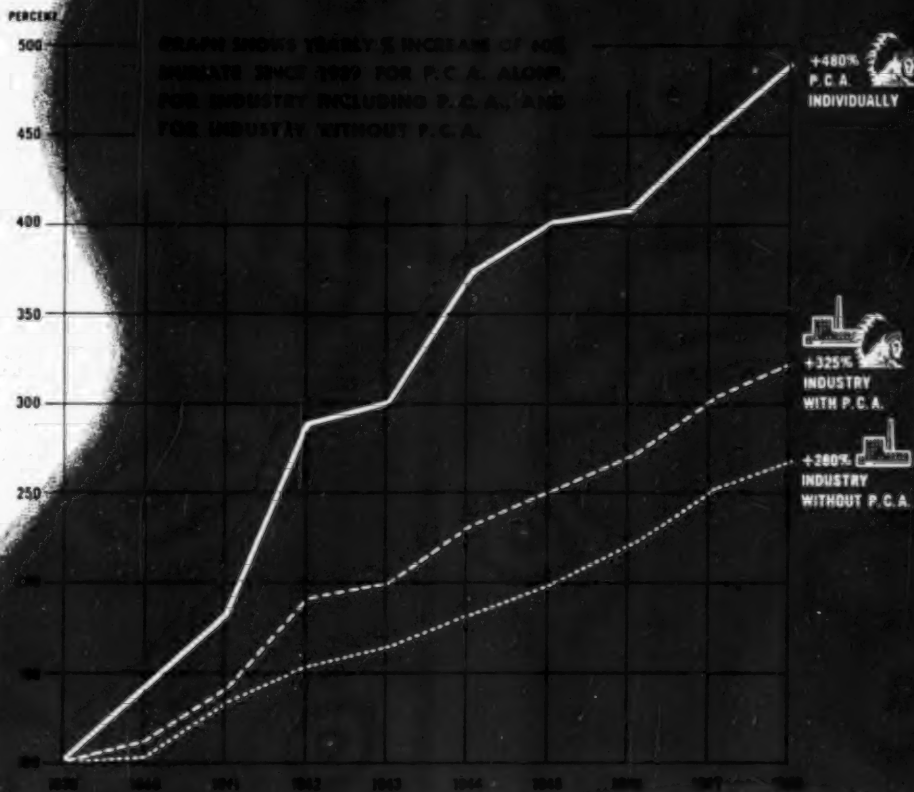
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Sales Offices: Philadelphia • Pittsburgh • Huntsville • Chicago • Fort Worth • Denver • San Francisco
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We've been doing some figuring...



1948 was a record year for domestic Potash. Using '39 as a base, the industry—not including P.C.A.—showed an increase of 280% in 60% Muriate. P.C.A. production lifts the industry increase to 325%. *P.C.A. alone shows a High Grade Muriate increase for the same period of 480%.*

95% of all P.C.A.'s '48 deliveries were in the form of 60% Muriate. Our new \$4,000,000 production and refining facilities now are operating. Our deliveries for '49-'50 will break all previous records. In fact, P.C.A.'s production capacity for 60% Muriate this year will exceed by some 150,000 tons the entire potash consumption—all grades—of the nation ten years ago.

These figures are graphic evidence of the leadership P.C.A. has won . . . leadership in volume, in economy to you and to agriculture.



Potash Company of America Carlsbad, New Mexico

GENERAL SALES OFFICE . . . 50 Broadway, New York, N. Y. • MIDWESTERN SALES OFFICE . . . First National Bank Bldg., Peoria, Ill.
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MARCH, 1950

When it's a *liquid toxicant...*



...it's a formulating job for **ATTACLAY**

Attacloy is a carrier which offers a *really satisfactory* way to formulate *liquid* pest control chemicals into dusts or wettable powders.

The following figures illustrate Attacloy's capacity to accept and carry high amounts of liquid toxicants *without loss of flowability*:

<u>TOXICANT</u>	<u>WT. % IN FORMULA</u>
Toxaphene	40
Chlordane	40 and 50
Parathion	15 and 25

In each case, the product formed by intimate mixing of toxicant and Attacloy is a dry, lump-free powder possessing a high degree of fluidity. Mixing, material-handling and packaging equipment are permitted to give full-capacity performance. And the dust mixture flows just as smoothly after months of storage.

This same thirstiness that works so well with liquid poisons has made Attacloy the industry's overwhelming choice for supporting low-melting point solid toxicants in dusts.

Whatever your production plans embrace—liquids, solids, new poisons or older "standbys"—Attacloy in your formulas will substantially ease production problems and enhance product salability.

ATTAPULGUS CLAY COMPANY

Dept. P, 210 West Washington Square, Philadelphia 5, Pa.

AGRICULTURAL CHEMICALS



**A Monthly Magazine
For the Trade**

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THIS MONTH'S COVER

Progress continues in the application field. Here is new type sprayer developed by Robinson Fan Corp., Gilroy, Calif., particularly for use in citrus groves. The new device is said to make use of both pulsation and oscillation movements rather than producing a steady stream of air. This makes for deeper penetration into the foliage. (Photo courtesy of Robinson Fan Corp.)

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The Work Horse in the packaging field

BEMIS MULTIWALL PAPER SHIPPING SACKS



They're tough and sturdy... have plenty of reserve strength even when packed with such heavyweights as cement or fertilizer.

Bemis uses top quality kraft paper. Each of the three or more plies has been tested for the kind of work it must do. So, there is never any question. It's sure to do the job.

Seven Bemis Multiwall Plants are ready to team up to give you service in an emergency or to provide a dependable source of supply.

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For "high-nitrogen" fertilizer —
use **Koppers Ammonium Sulphate!**

Koppers produces a good commercial grade of ammonium sulphate—the element that is so essential to fertilizer because of its nitrogen content. Koppers Ammonium Sulphate has a nitrogen content of not less than 20.5%, and is low in free-acid and moisture contents.

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Koppers Ammonium Sulphate comes in crystals—grayish to white in color. It is soluble in water. The specific gravity is 1.77.

Shipment

Koppers Ammonium Sulphate is shipped in bulk in box cars and trucks. It is also available in 100 lb. and 200 lb. bags.



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(TOXAPHENE)

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(2, 4-D)

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3. A&S bags are available in 1 to 6 plies—1 to 100 lbs. and over.

4. Modern designs by packaging specialists and creative artists.



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Expendable Pallets—Palletized shipments of A&S bags lower your handling costs, minimize storage space.

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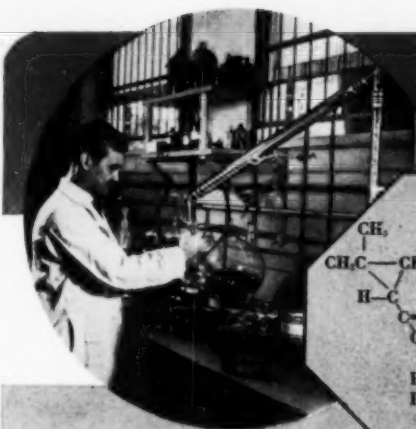
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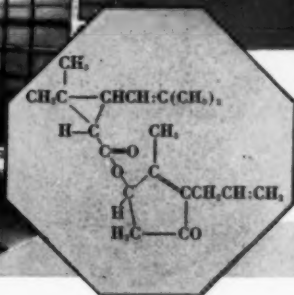
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(Synthetic "pyrethrum")



**—more precisely:
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of Cinerin I**

In November we announced the manufacture of Pyresyn so deliveries could start January 1st. The program was slightly delayed but we now have this new and unique synthetic material available in commercial quantities.

It can be used similarly to natural pyrethrum extract in making household and dairy sprays for the control of flies, mosquitoes and roaches either by itself or in combination with other insecticidal materials.

Samples and quotations available on request.

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50 CHURCH STREET, NEW YORK 7, N. Y.
Telephone, COrlandt 7-1970



& COMPANY

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Chemico offers a complete engineering and contracting service to the fertilizer industry, ranging from the design and construction of complete fertilizer works to furnishing small individual units and auxiliary plants of a specialized nature. From Pittsburgh to Pakistan, from Colombia to China, Chemico has been

building such plants since 1914. Chemico brings to each new project a wealth of experience, proven methods and guaranteed performance.

If your plans include the production of nitrates, superphosphates, double superphosphates, ammonium phosphates, mixed salts or any other commercial fertilizers, it will pay you to discuss your specific problems with Chemico.

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Columbia a reliable source
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A high purity Columbia product consisting of white to clear crystals with a pleasantly aromatic odor. Vaporizes readily, leaves no residue, does not stain, is insoluble in water.

In six mesh sizes especially suited to packaging or blocking.

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Available in 55 gallon drums and 8,000 gallon tank cars.

Columbia will handle your requirements promptly and dependably. Both Para and Ortho are available in mixed car shipments. In many cases, you will realize other definite advantages. Your inquiries are invited. Pittsburgh Plate Glass Company, Columbia Chemical Division, Fifth at Bellefield, Pittsburgh 13, Pa.



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PITTSBURGH PLATE GLASS COMPANY

Yes!
dependable

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Fertilizers and agricultural chemicals are usually stacked out in the fields before they are used, and therefore must be packed in containers that will provide protection against rain, sun, snow and sleet. Yes . . . Hammond Betterbags will do just that. Your brand and necessary instructions attractively printed on these bags will keep farmers and nurserymen coming back for more and more of your products. Write today for quotation on your paper bag requirements.

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PASTED
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SEWN
VALVE TYPE



OPEN MOUTH
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OPEN MOUTH
SEWN BOTTOM

Here's how this *Customized* **Baughman** **BULK HANDLING EQUIPMENT** **Makes more money for you**

Sell for less — eliminate bagging by handling in bulk and delivering in bulk. It's the most practical, the most efficient way to handle commercial fertilizers.

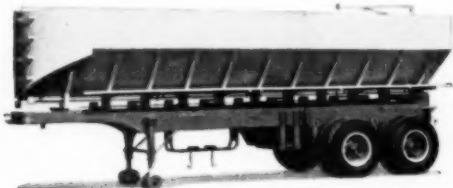
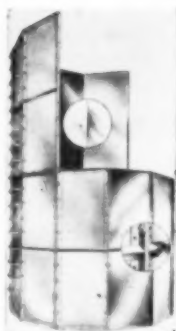
BAUGHMAN Equipment gives you automatic material flow direct from car to storage bin or hopper bin . . . from storage bin to hopper bin for delivery. Cuts man hours to the minimum.

LOW COST. Build your Belt and Bucket Elevator (right) from standard 10' sections . . . eliminate the expense of a custom-built installation. All Baughman equipment is economically produced by assembly line methods for further savings. Ruggedly built of alloy steel for long life.



MODEL Q SCREW CONVEYOR loads and unloads cars and trucks quickly and efficiently — the perfect teammate for the Belt & Bucket Elevator! Big 9" conveyor screw gives up to 40 bu. per minute capacity from the horizontal to 50°. Available with or without wheels.

SECTIONAL STEEL SILO (right). Adjustable to meet changing needs! Can be enlarged . . . made smaller, higher or lower . . . or moved anywhere. One section has ladder on both sides. Upper inset shows smooth inside seams . . . lower inset shows easy assembly detail. **ANOTHER BAUGHMAN FIRST!**



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WRITE FOR COMPLETE DETAILS



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131 SHIPMAN ROAD

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PRENTOX PEST-TESTED

WHY NOT PROTECT FOOD CROPS IN STORAGE FROM RATS AND MICE

as you protect them from insects and diseases in the field?

RODENT CONTROL AND CROP PRODUCTION

Millions of dollars worth of insecticides and fungicides are used each year to produce our nation's farm crops. But little or nothing is done to protect them from the 150,000,000 rats and untold number of mice that attack these crops in storage. \$400,000,000 is a big price to pay for this damage. Rats eat or spoil half this amount yearly in cereals and cereal products alone.

When crops are protected in the field, only half the job is done. It's just as important for the farmer to protect his crops in storage as it is to protect them in the field.

A POTENTIAL RODENT CONTROL PROGRAM THAT MAKES SENSE!

Tested under an experimental permit from USDA for the past four months, RAX powder (new rodenticide containing WARF Compound 42) is giving results that indicate easy, economical and safe control of rats and mice on the farm. While RAX is not permitted to be sold indiscriminately, we urge that manufacturers and distributors of

agricultural chemicals investigate this new potential market. RAX powder is offered experimentally to interested companies for testing as a rodenticide on an experimental basis to be repacked under their own label. It is not approved by USDA for resale to consumers at present but you, as manufacturers of agricultural chemicals, should be ready to offer such a rodenticide when approval is obtained.

These Are Typical Comments On RAX

Virginia: "Rax Powder is the only rat poison we have found to give us the results we so badly needed. With its use I firmly believe we will obtain better than 90% control."

Maine: "Damage ceased completely with no rats observed . . . Results excellent—Population wiped out."

Miami, Fla.: ". . . after seven days no signs of rats were noticeable."

New Jersey—Chicken Farm: "bait placement set by owner and employees. Result: dozens of dead rats picked up—no live rats apparent."

Florida—Grocery Store: "have tried other rodenticides in this location but RAX is the only material that eliminates mice trouble."

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this machine



**can speed up your packaging...
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What's more, St. Regis Multiwall Paper Bags give your product thorough protection, are clean and easy to handle, resist moisture, deliver full weight by eliminating sifrage and retention, are rugged and economical.



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is unable to withstand high
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help stop corn borer in 1950 crop!

FREE OF BORERS, corn
yields more bushels per
acre and shows greater
resistance to wind.

Corn borers caused a loss of more than 275,000,000 bushels of corn in the corn-belt states alone last year. Losses ran as high as \$750 to a farm. With such losses fresh in their memories, 1950 corn growers will expect you to have ample insecticide to combat the corn borer, which may attack twice this year.

That's why it will pay you to place your order now for Santobane, Monsanto's DDT. Have merchandise on hand and profit by getting farmers to stock their next summer's needs now.

Properly formulated Santobane has broad insecticidal qualities, acting both as contact poison and stomach poison. It is an effective insecticide base for use in dusting powders, emulsions, suspensions and solutions.

Santobane, available in 100-pound fiber drums, can be shipped immediately. For further information and quotations, mail the coupon or contact the nearest Monsanto Sales Office.
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Emulsifiers and Wetting Agents. Ask for
new Technical Bulletin No. P-142.



MONSANTO CHEMICAL COMPANY
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Please send _____ Bulletin P-142; _____ information and quotations on Santobane and on the following Monsanto insecticidal and herbicidal chemicals _____

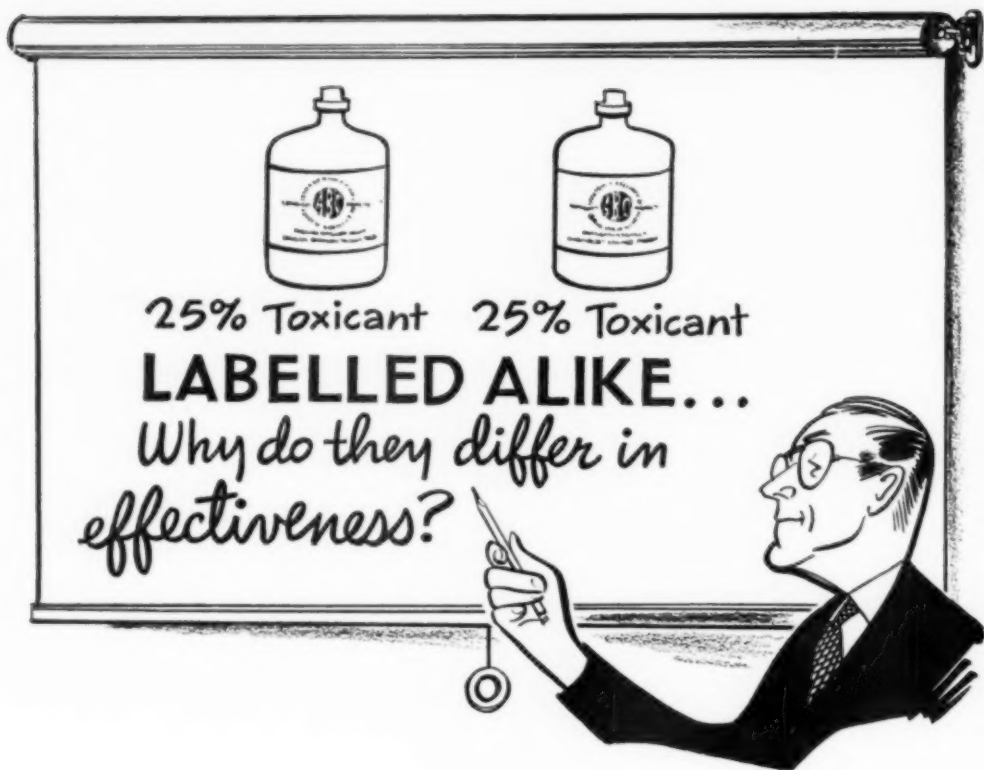
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City _____ Zone _____ State _____

S E R V I N G I N D U S T R Y . . . W H I C H S E R V E S M A N K I N D



IT'S PUZZLING all right! Two insecticides with the same percentage of toxicant used under similar weather conditions show widely varying killing power! Why?

There's really no mystery about it! Different emulsifiers, for example, can make the difference—a big difference. Even though the emulsifier is not itself a toxic agent, it does give the toxicant the ability to penetrate, to spread, to mix homogeneously in many different types of water—all factors that greatly affect killing power against insects, as well as the safety of use on plants.

You'll want to keep up with the latest findings in emulsion technology. So write for the new Atlas pamphlet showing typical formulas for using Atlox 1045-A, Atlas G-1256, and other versatile Atlas emulsifiers. Formulations include chlordane, toxaphene, benzene hexachloride, DDT, piperonyl compounds, and other toxicants.

Atlas, Reg. U. S. Pat. Off.

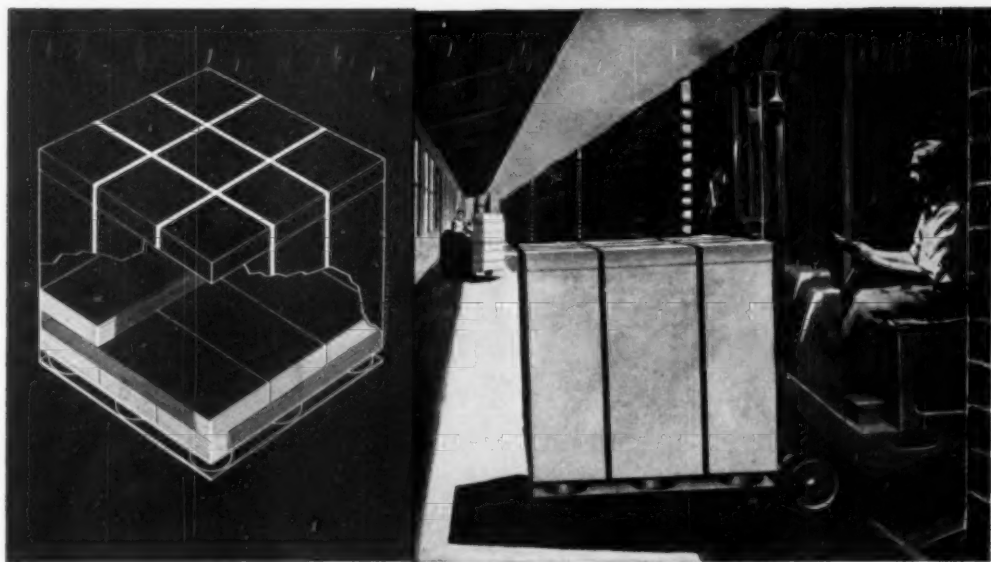
ATLAS

INDUSTRIAL
CHEMICALS
DEPARTMENT



ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco
In Canada address *A. F. Sterne and Sons* Brantford, Ontario

LIMITED



Your
Union Multiwall Specialist
 will show you how to make
Handling Labor more productive

ONE of the hidden costs in packaging is in the handling of packaging materials from unloading dock to warehouse to packaging assembly line.

Thanks to new ways of shipping and handling, many firms now find savings in handling costs alone more than justify a switch to Union Multiwall Bags. The Union Multiwall Specialist who calls on you, can tell you all about the recent cost-cutting developments in handling of multiwall bags.

He'll show you, too, why more than 300 industries now find Union Multiwall Bags cut packaging costs all along the line—in handling, packaging, shipping—yes, and in better product protection, too.

Even if you're now using multiwall bags, the Union representative who calls on you can give you new ideas to save money. For he is backed by the skilled engineers and packaging experts of America's largest maker of paper bags.

Let him show you how Union resources and packaging experience can help you!



Multiple Protection



Opens Easily



Prevents Siftage



Empties Clean

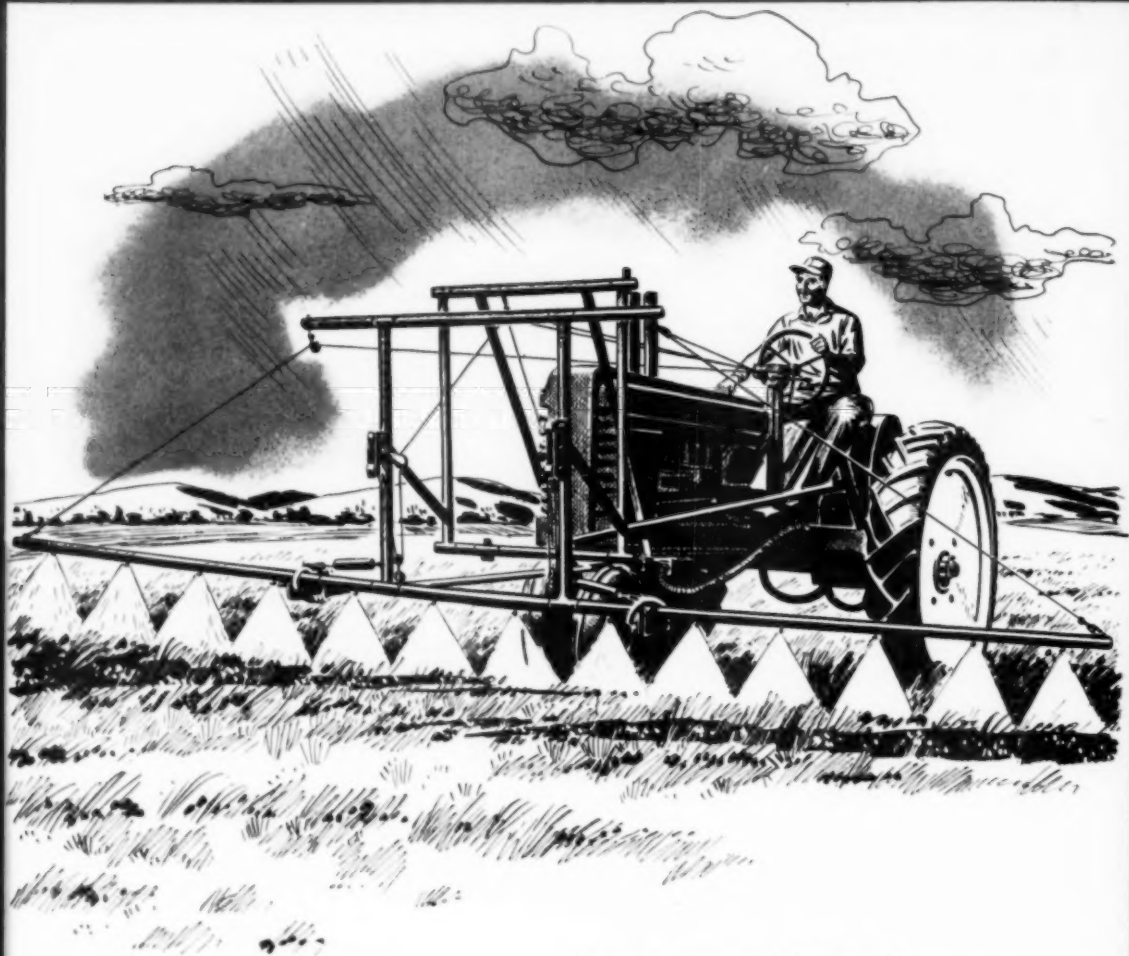
UNION Multiwall Bags

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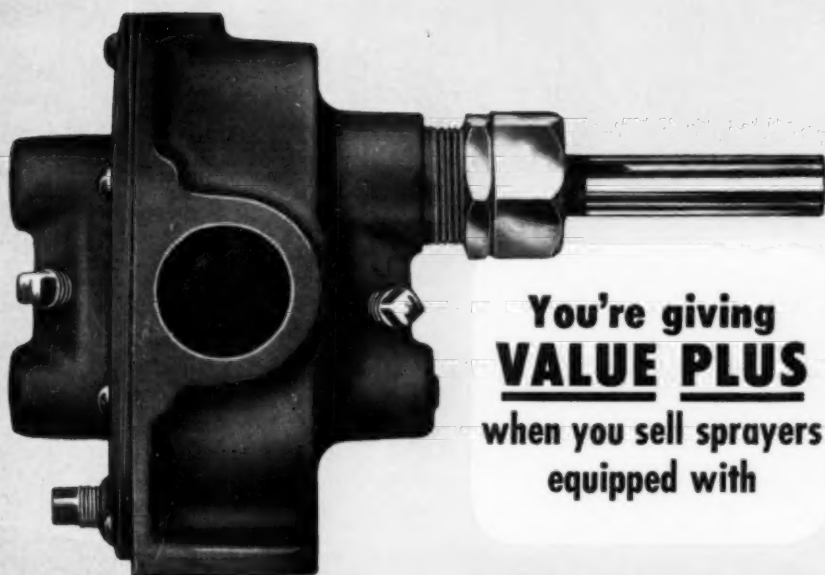
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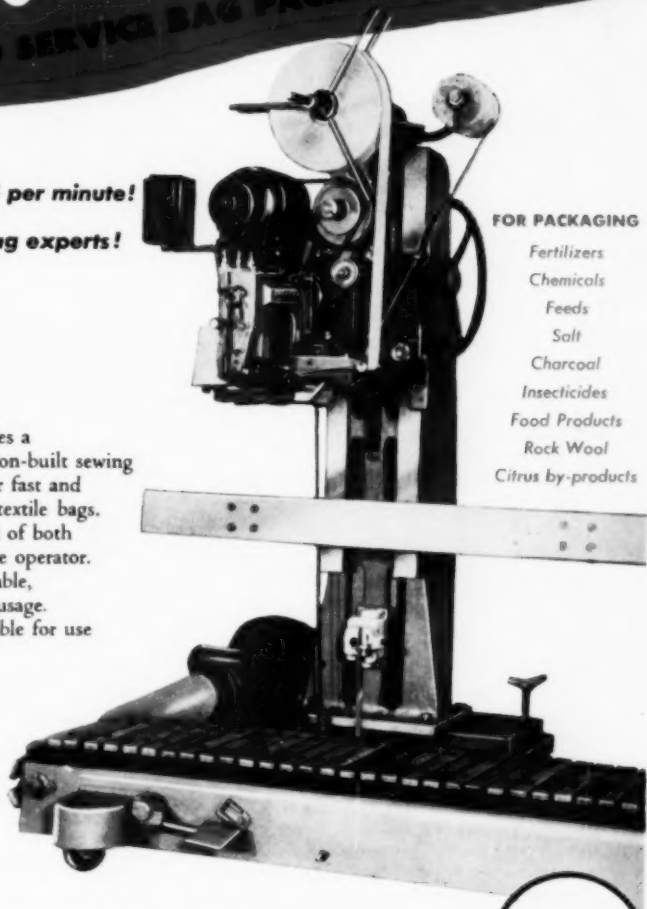
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THE EDITOR COMMENTS

LAST month the Federal Trade Commission's report on the fertilizer industry was discussed here, paying particular attention to the charge that the industry has neglected the sale of high analysis products. Elsewhere in this issue are a series of opinions from industry leaders which cast considerable doubt on the validity of this charge by the FTC. The point is made that over a period of years fertilizer manufacturers have followed the logical industry trend of offering mixtures of higher and higher plant food value, that they have no reason for standing in the way of real progress, but rather have strong and compelling reasons for offering their customers formulations which will be most acceptable and economical. Quite generally the particular formulas that they supply are specified for them by state agencies. To most fair-minded observers, then, this charge of fondness of fertilizer manufacturers for selling "filler" under the guise of fertilizer falls of its own weight.

What really is behind the charges of the Federal Trade Commission, some observers have asked? It looks to us as if this attack on the industry is a thinly-veiled scheme to justify putting the government into the fertilizer business on a much broader scale than at present. Included prominently in the FTC report is a proposal for the TVA to set up a "national fertilizer program." Even if the industry had fallen down on its job, which obviously is not the case, government as a substitute is not the answer. If it is government fertilizer today, it can be government coal and steel next month, and government shoes and tooth paste next year.

An excellent object lesson stands before us at the moment in the British socialistic experiment, which is bankrupting that country and stifling production, even though supported by billions of dollars collected from American tax payers. The time to head off the experiment here is before it starts. The issue is of course much more important than just one of socialistic fertilizer.

The whole idea of government manufacture of any product which can be and is being supplied by private industry, the whole idea of government competing with its citizens, is fundamentally wrong. We are, in the United States, still supposed to be operating under the theory of free enterprise,—and it's time that we insist on so operating. Either we have private enterprise,—or we don't!

THE coal strike which has brought creeping paralysis to the entire country over recent months offers a serious threat to manufacturers and users of agricultural chemicals. Essential production of by-product benzol, nitrogen and the like has been cut off, exaggerating a shortage situation which was already serious enough. A leading manufacturer of agricultural insecticides was reported early this month ready to shut down all operations depending on benzol or phenol. Even though the strike is now settled, this lost production cannot be made up in time to re-establish normal supplies for months to come.

Production of DDT and BHC, as well as other basic insecticides, have suffered. Many manufacturers are shipping out yesterday's production today, with no assurance that they may be operating tomorrow. Stocks are reported at low ebb. Meanwhile the U. N. is reported seeking over a half-million pounds of DDT for export, and, if they are successful in obtaining this quantity, this would just about wipe the market clean.

The brightest spot in the supply picture seems to be that there has been a substantial amount of advance buying this season. Warned by their experiences last season, some buyers have anticipated, while others, concerned over the coal strike, have been scurrying around over recent weeks to cover requirements in a sharply firmer market. If 1950 should prove to be a big insect year, as it has been forecast it will be, DDT and BHC could be very scarce articles by the time the crops start breaking through.



Guest Editorial written especially for
this issue of Agricultural Chemicals.

POTASH--- *An All-American Institution*

By

Dr. H. B. Mann

President, American Potash Institute
Washington, D. C.

THE centennial of the fertilizer industry naturally calls to our attention the development of American potash, a vital part of the fertilizer industry. In early colonial days one of the few products exported from this country was potash. It was produced from the ashes of trees from our forests. This industry reached its peak in 1825 and declined rapidly after the Civil War when Germany began the development of its natural potash deposits and delivered in this country potash at prices far below the cost of the wood ash product. Thus our industry faded out of the picture and we became dependent upon imports for our chemical and agricultural potash needs.

It was not until 1910, however, that this country awakened to the stark fact that we were entirely dependent upon a single foreign country for our supply of this vital chemical. In 1911 Congress, stimulated by the cancellation of favorable contracts held by American buyers, made an appropriation for the exploration of potash in the United States. These explorations were most opportune. With the outbreak of World War I, German importations

were abruptly terminated. The potash-bearing raw materials listed as a result of Federal surveys were immediately placed under industrial development and from these sources some 58,000 tons K₂O were being produced in 1918. During this period of scarcity the price had risen from about \$35 per ton for 50% muriate to around \$500 per ton.

With the reappearance of German potash in this country after the war, most of our 128 producing units disappeared, with one notable exception—the plant in California which was taking potash from the brines of Searles Lake, California. This company, now the American Potash and Chemical Corporation, was our chief source of domestic potash until the development of the mines at Carlsbad, New Mexico.

In 1926 a bill was passed by Congress authorizing explorations for potash in the Permian Basin which is a vast area underlying parts of Texas, New Mexico, and the states to the north. Under this authorization many core tests were drilled and beds of potash salts described as of possible commercial value were encountered. Concurrently, drillers exploring for oil in the Permian

(Turn to Page 93)

Control of Northeastern Livestock Parasites by use of efficient

INSECTICIDES

by

Dr. H. H. Schwardt

Cornell University
Ithaca, New York

THE control of external parasites of livestock presents many special problems in the Northeastern states. In this region, dairy cattle, sheep, and swine are kept in tight warm quarters during the long winter season, a system that encourages rapid development of incipient parasitisms. Many northeastern dairy barns are warm enough that house flies and stable flies can develop all through the winter in numbers sufficient to form an early nucleus for summer infestations. The "loafing barn-milking parlor" set-up which has received much publicity in the northeast, encourages flies because manure is not removed from the loafing barn during the winter season. In the field of meat production this is a "feeding area." Thousands of steers and lambs are shipped in from the west and southwest to be fattened in part on the excess forage available. The majority of the lambs and many of the steers arrive well loaded with external parasites, some of which probably migrate to the native livestock. Finally the dipping procedures, routine on many western farms, cannot be applied to dairy cattle because individual herds are not large enough to justify building a vat, and dipping the heavy dairy breeds of cattle probably would be impracticable.

Mange mites, lice, cattle grubs, and several kinds of blood-sucking flies attack northeastern cattle. The mange mites are the most insidious of these pests since their microscopic size allows them to multiply unnoticed until serious lesions appear on the hosts. In rare instances cattle are in a dying state before the owner realizes the reason for their condition. Mange is largely a winter problem in the northeast.

Cattle mange may be caused

by any or several of the four kinds of mange mites but the Chorioptic, and Sarcoptic types are most prevalent in the northeast. The Chorioptic mite feeds at the surface of the skin while the more serious Sarcoptic mites burrow under the surface.

First symptoms of mange usually are small raised areas the size of pin heads occurring anywhere on the body, but most often on the posterior portions. The back of the udder is a favorite point of attack. In some herds infestations apparently never progress beyond this stage, but normally the mites multiply rapidly. In advanced cases most of the hair falls out, and the skin becomes thick, wrinkled, and scab encrusted. Cattle in this condition scratch, lick, and rub the afflicted areas until they are bloody. They become severely emaciated and a few are lost. Experienced dairymen are very sensitive to the general condition of their cattle and often suspect mange when the animals become restless, rattle the stanchions a great deal, and appear to be in discomfort even though no apparent cause is observable. Heavy infestations of lice will cause a similar restlessness, but lice are easily found. During severe infestations of mange, milk flow is reduced markedly, but the animals continue to eat almost normal amounts, thus adding to the overall loss.

When mange becomes apparent in a herd, the owner sometimes yields to the temptation to sell all or part of his herd. This is a serious



Above: Four animals in this 35-cow barn died from the effects of mange. Note complete loss of hair on the cow lying in the foreground.

Below: Close-up shot of sheep-dipping operation in portable vat pictured on page 34. Such treatments have proved valuable in many cases.





Portable vats are the answer to the sheep dipping problem when scattered

small flocks are involved. The one above is the Cayuga County, New York vat.

error, since mange is curable, and selling the animals for any purpose other than for immediate slaughter will serve only to spread the infestation to other herds. Moreover in New York state mange is a reportable disease and it is illegal to sell infested animals except for slaughter. Any farmer who discovers mange in his herd should report it to the state veterinarian, and veterinarians, county agents, and others connected with animal industry should report any cases seen, or suspected. This may occasionally bring hardship on a dealer's herd but will contribute greatly to the general prosperity of dairymen.

During two years of testing by various agencies, benzene hexachloride has given consistently good control of cattle mange. Unfortunately, there is much confusion in dosage recommendations. One published report states that eradication was accomplished in most herds with a suspension containing .025% gamma isomer, while one of the leading manufacturers recommends nearly six times this dosage. During the spring of 1948 Dr. D. W. Baker and the author treated 17 herds in central New York using dosages of approximately .03% and .05% gamma isomer. Neither dosage eradicated mange in all herds in one application, but

the effectiveness of the material was well established.

Further testing of benzene hexachloride during the winter of 1948-49 established the usefulness of benzene hexachloride in mange control on dairy animals and proved beyond reasonable doubt that no taste or odor hazards are involved when pure gamma formulations are used. In a state-wide control campaign supervised by Dr. Ivan G. Howe, Director of New York's Bureau of Animal Industry, over 100,000 dairy cattle were treated. Not a single instance of milk odor or flavor was recorded and milk analyses by Dr. L. B. Norton showed that residues were very low and of short duration. The standard dosage used was 1½ pounds of 25% gamma material in 100 gallons and two gallons was applied to each animal. Two applications a week to ten days apart were made. Dairymen were so well pleased with both louse and mange control obtained that many say they expect to make the treatment routine each season even if only for louse control.

It should be noted however that complete eradication of mange apparently was not attained at this dosage and schedule. Many of the treated herds showed minor symptoms of mange recurrence several months after treatment but this occurred so

near the time for turning out to pasture that retreatment was not necessary.

Cattle Lice

CATTLE lice are a perennial winter problem in most northeastern dairy herds. The earliest infestations usually appear about mid-November and the trouble continues until pasture time the next spring. All four common species, the short nosed, long nosed, little blue, and little red lice are present. The little red is by far the commonest, if New York infestations are typical of the northeast, and the short nosed louse is seen least frequently. While our knowledge of the injury cattle lice cause is based entirely on estimates, there is little question that an animal so heavily infested that nearly every square inch of its body carries several lice is in serious discomfort to say the least. Dairymen are increasingly of the opinion that any interruption of a dairy cow's normal routine may reduce milk production. In addition to irritation there is loss of blood, and loss of feed which goes to support the lice.

Cattle lice are easily controlled with at least four common insecticides, and the many failures reported probably are due to faulty timing and poor methods of application rather than lack of toxicity in the materials used. One-half per cent rotenone, 10 per cent DDT, 5 per cent activated sabidilla, .25% chlordane, or benzene hexachloride at about the .25% gamma level will kill cattle lice if applied as dust in sufficient amount. In New York, rotenone is recommended because it is highly effective, inexpensive, has no ill effects on the operator, and is beyond reproach so far as residue hazards are concerned.

Results of several years' work in New York show that thorough treatment of every animal in a herd when the first lice are seen is the most effective way to control lice. Many dairymen dust patches of lice as they appear on individual animals. They never get all the lice and sporadic dusting has to be continued all winter. Covering the entire animal at one time is important. Failure to dust the insides of the ears, or the

brush of the tail may allow the survival of enough lice to cause early reinfestation. One thorough application usually takes care of the lice for the winter.

Recent tests suggest that northeastern dairymen might profitably turn from dusting to spraying for cattle louse control. Spraying just after the herds were taken off pasture and stabled for the winter has given all winter control of lice in several dairies with long records of louse trouble. One pound of 5% rotenone, 4 pounds of 50% wettable DDT, or 1½ pounds of 25% gamma benzene hexachloride was used, and two gallons applied to each animal at 400 pounds pressure. Spraying is a more desirable job than dusting and without question gives better coverage. While more expensive equipment is needed for spraying, many of the recently offered small power sprayers are well within the means of most dairymen, especially since they can also be used for garden spraying, whitewashing, disinfecting, grooming, and even on occasion as fire extinguishers.

If complaints from growers are a fair indication of insect injury, cattle grubs are not a serious problem in northeastern dairies. Only a minor part of the dairyman's income is derived from meat and hides. Grubs are seldom numerous on first calf and older milk cattle. A few dairymen do report that milk production suffers during the period when heel flies are chasing the cattle but there are no accurate figures on this loss.

Cattle grub control is complicated in the north by the presence of both northern and southern grubs whose consecutive seasonal cycles spread over a long period of time. The earliest *Hypoderma lineatum* (southern) grubs come to the backs of cattle in March, and the last individuals of *H. bovis* may not emerge until mid-July. This means that a minimum of five applications probably would be required for anything approaching 100% control. Young stock, which always are most heavily infested, are sent to pasture about May 1 and often it is impractical to get them in again until fall. An applica-



Wool maggot infestation induced on animal by fermentation of wool following a heavy rain.

Proper care with dipping prevents occurrence of such infestation. Portable rigs make pest control possible on sheep herds.

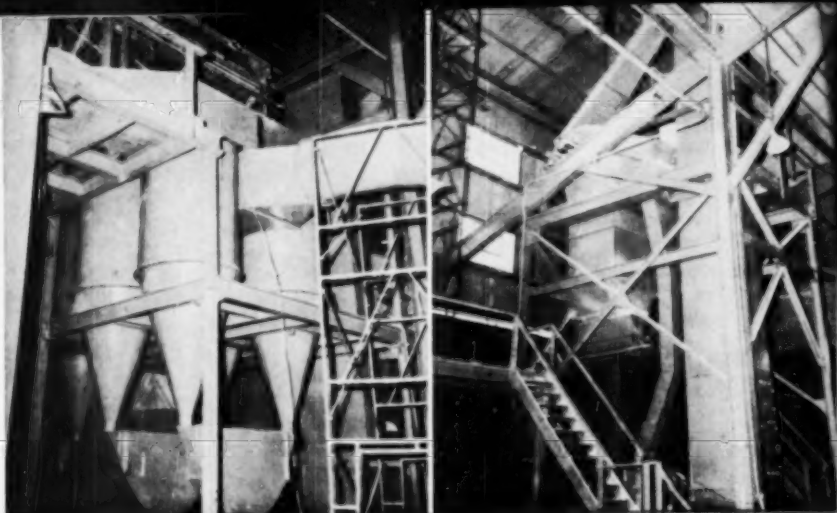
cation about April 1, and another May 1, are all that most dairymen can apply without considerable inconvenience. Large scale tests using this two-application schedule have given sufficient control to justify the expense and work. However, this schedule may allow the development of many late season individuals. Approximately one per cent rotenone dust was used in most of these tests. A two per cent dust increased the grub mortality only three per cent.

Fly Havoc

BLOODSUCKING flies, if judged again by grower complaints, have had effect on the contents of the northeastern milk pail. Observations on dairy animals in pasture during the 1945-48 period show that horseflies lead in injury by this group. Horn flies are plentiful during parts of some seasons in New York but probably cause only a fraction of the loss attributable to horseflies. Three species, *Tabanus quinquevittatus* (alias *T. vicarius* and *T. costalis*), *T. lasiophthalmus* and *T. sulcifrons*, known to dairymen as "green heads," or "copper heads," are the chief offenders. Unfortunately the adult cycles of these three flies occur consecutively during the season so that flies are present in abundance from June until late August. No means of

controlling them has as yet been developed. Though horseflies are highly susceptible to either DDT or benzene hexachloride, these materials give no relief when sprayed on animals. The flies visiting a sprayed animal probably are killed but not before taking a meal of blood. It is doubtful that practical control would be obtained even if all domestic animals in a considerable area were systematically sprayed. The flies have many natural hosts. Their reproductive capacity is large, and neither adults nor larvae appear to be much reduced by natural enemies. The adults are strong fliers and probably capable of traveling long distances. They also travel widely on their hosts and have a habit of entering moving automobiles. Repellents thus far developed appear to be of little use against these flies, and oil base materials may injure cattle as much as the flies. Even if an effective repellent were found, it would be impractical unless its cost were extremely low or its effectiveness of unbelievable duration. A two or three day repellent probably would be useless even at the price of water, since thorough spraying of a large herd twice or three times a week would be a burdensome addition to the already heavy summer routine on most dairy farms.

(Turn to Page 87)



New "Dream Plant" at Des Moines Where Iowa Plant Food Co. Produces **GRANULAR FERTILIZER**

DESCRIBED as a "plant manager's dream," the new granular fertilizer mixing plant of the Iowa Plant Food Co., Des Moines, is now a reality. In operation since the first of the year, it has a capacity for production of from 10 to 15 tons of granular fertilizer per hour, or from 35 to 40 tons of regular mixed fertilizer per hour.

Indicative of a fast-awakening interest in the application of more fertilizer to increase farm yields in the midwest, this plant has a number of features which make it outstanding and unique in its area. The physical plant, including the complete system of overhead conveyor belts, storage

facilities, and over-all layout, was installed by the John J. Harte Company, Atlanta, Ga. Harte was also responsible for the construction of the building. The material handling, weighing and mixing machinery and the granulating equipment, which stamps this plant as being ultra modern, was furnished by the Sturtevant Mill Company, Boston, Mass. It is the first such installation in the midwest.

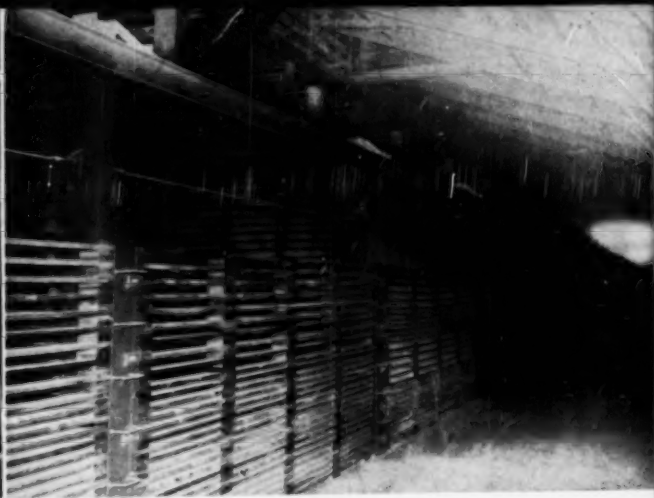
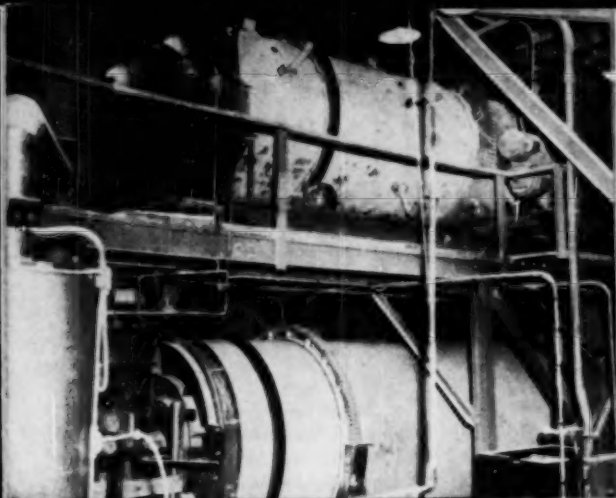
That the company anticipates a thriving business with Iowa farmers is indicated by Ray Sorensen, manager of the company. He says that much emphasis is being laid on high-analysis fertilizer materials, "tailor-

made" for Iowa crops. These products, such as 10-20-0, 8-32-0, 5-20-10, 4-16-16, and 4-24-12, will be made in both granular and regular form. These various grades are for oats, legume seeding, and corn for the most part.

Although the company is anxious to provide high analysis fertilizer materials to farmers, in order to save transportation and other handling costs, Mr. Sorensen said that some opposition is met from farmers. The element of fear that the better grades of fertilizer may be "too strong" does not enter into the picture much in Iowa, he says. However, an-

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In the Photos:

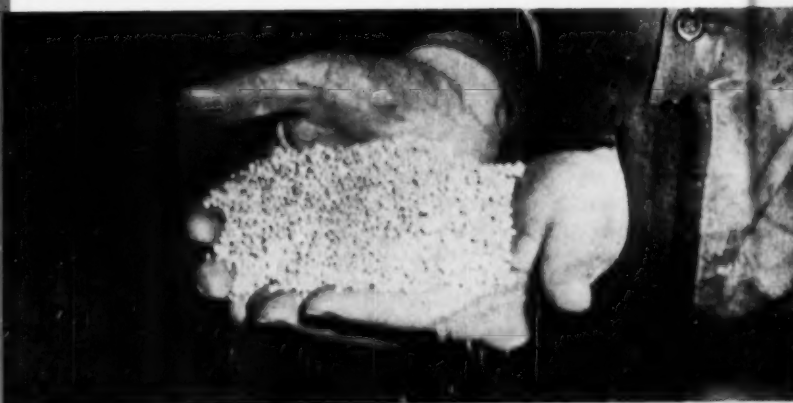
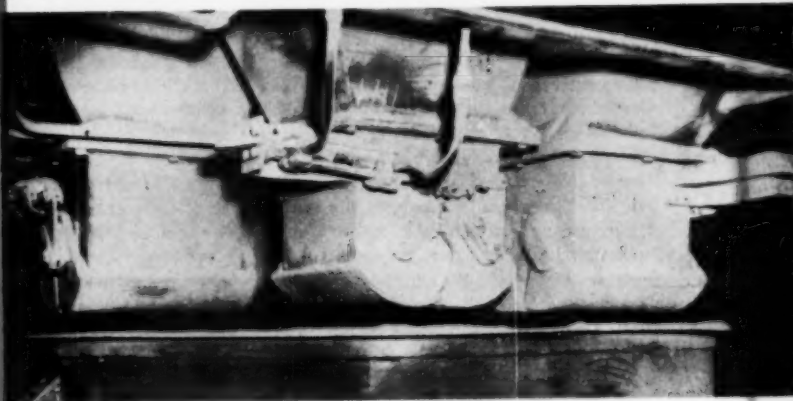
Page 38, top (L to R) Plant superintendent Gus Mautner watches Pay-loader transfer fertilizer material from bin to elevator hopper. (Second picture) Sturtevant dust collector which takes the "lines" from granular material for re-circulation in the system. Third photo: Inside vertical "box" is elevator to transfer material up 60 feet to conveyor belt at top. Bottom photo, page 38: General exterior view of Des Moines plant. Side tracks from Rock Island railroad parallel 400-ft.-long building on two sides and platform makes truck loading easy in front of building.

This page, first photo above the heart of the granulating system. Top rotating cylinder rolls the dampened material into granules which are in turn directed into the drier, also a rotating cylinder. Below, upon leaving drier, granules are sent over a series of screens to maintain uniform size in the product. Both the too-fine and too-large particles are re-circulated in the system for re-processing.

Right (top): General view of storage bins containing various grades of fertilizer. All bins are filled from overhead conveyor belts. Next photo: Hydraulic valves give positive control in weighing batches for mixing. Plant management expresses particular appreciation of these.

Right: Closeup of granular fertilizer indicating free-flowing properties and uniform size for easy application.

Below: Valve-packer packages fertilizer into 80 pound bags for distribution on Iowa farms.



Chemical Structure and action of **HERBICIDES**

RECENT introduction of a number of new chemical weed killers has provided an array of chemical types that allows a comparative analysis of herbicidal action. Although conclusive evidence on the chemical mechanisms responsible for phytocidal action is meager, certain information readily available to the chemist and plant physiologist is often lacking in the commercial field. We are attempting in this article to clarify some of the obvious points, to indicate the many gaps in our knowledge, and to point the way for future research.

Most people are curious concerning the how and why of chemical reactions that come into everyday use. Particularly is this true of the action of new materials. To satisfy this curiosity the salesman is often required to conjure up explanations and these may bear little or no relation to the actual mechanism involved. Popular literature is full of these rationalizations in which the ingenuity of the author may greatly exceed his chemical knowledge.

Progress in the agricultural utilization of chemical knowledge requires a basic understanding of the general relations of chemical properties to the biological responses involved. Particularly is this true in pest control where application methods may be dictated by such relations. Recent strides in chemical control indicate the tremendous possibilities that lie ahead; it seems possible that man will soon be able to control the environment in which his crop plants grow to a degree undreamed of a few years ago. Essential to this progress is a parallel development of physiological experience based upon sound research and amply tested in the field.

Many chemicals are now used as weed killers and in their action many chemical reactions are involved. Among these chemicals occur strong acids and bases, heavy metals, strong oxidizing and reducing agents, and highly soluble salts that are strong electrolytes in solution. Included also are aromatic and olefinic hydrocarbons, organic acids, high sulfur oils, elemental sulfur, and the aliphatic oil carriers. Finally, the newer herbicides partake of the nature of enzymes and hormones and these may be combined with coupling agents and detergents that aid in solubility and penetration of plant surfaces.

Among the chemical reactions are several of a very general nature; in contrast are many very specific reactions, unique with respect to plant type, plant family or even, in certain cases, plant species.

Early Herbicides

MOST of the early used herbicides were strong chemicals; acids, bases, or their salts. Sulfuric acid, one of the most generally used, is still popular as a selective spray for killing weeds in onions.

It has been suggested that sulfuric acid kills cells by dehydrating them. It is true that concentrated sulfuric acid will dehydrate, even to the extent of breaking down chemical structure. A familiar example is the effect of concentrated sulfuric acid on sugar. However, at the concentrations used in weed sprays (around 1 Normal) sulfuric acid dehydrates no more violently than sugar solutions in which cells may remain healthy for days. On the other hand, any strong acid of the above concentration will quickly penetrate the leaves, denature the

protoplasm, decompose the chlorophyll, and disorganize the nucleus and plastids. This is a direct result of the high hydrogen-ion concentration and it takes place in cells surrounded by an aqueous medium as well as in sprayed leaves. Any acid sufficiently strong to overcome the buffering capacity of the protoplasm and markedly alter the pH of the cell will kill in the same way.

Iron and copper sulfates were also used as selective herbicides and being salts of weak bases these sulfates hydrolyze to produce active hydrogen ions. Though the pH does not attain the values of the acid solutions mentioned, it varies sufficiently from that of the cells to cause injury. In addition, these salts dissociate to produce ferrous and cuprous ions, both active as heavy metals in the denaturing of proteins. Iron sulfate is used in concentrations of 20 to 30 per cent, copper sulfate at 1 to 5 per cent. The former requires concentrations capable of producing toxic pH values; the latter is effective through its copper toxicity. The chloride, nitrate and acetate of copper are also effective selective weed killers.

Sodium arsenite is an extremely toxic chemical commonly used as a contact herbicide and as a soil sterilant. Being mildly alkaline and highly buffered, a sodium arsenite solution softens and penetrates the leaf surface by its hydrolyzing effect on the plant cuticle. After entering, the arsenic ions react violently with the proteins, denaturing the protoplasm and causing death. Penetration of arsenicals can be enhanced by increasing the alkalinity or by neutralizing and acidifying the solution after it has been diluted to field strength (about 1 per cent

by

A. S. Crafts and W. A. Harvey

University of California

As₂O₃). The latter acidified solution translocates readily, and under favorable conditions will kill the roots of deep-rooted perennials to depths of several feet.

More Recent Herbicides

CHLORATES constitute an important group of herbicides and sodium chlorate is the basic material in most common use. It has been shown that chlorates have different physiological actions upon plants. (1) They act as contact poisons when used in concentrations around 2 per cent. (2) They translocate and kill roots if properly applied. (3) They may be absorbed from the soil and kill both roots and tops of plants. (4) When present in sublethal concentration they cause chlorosis of the leaves and starch depletion in stems and roots. Probably these are all evidences of a common toxic effect, the variations depending upon concentration and location of the chemical.

The chlorate ion has a strong oxidizing potential but has a low tendency to react. Its toxic action probably results from the high oxidation capacity of the chlorine atom (valence change of from +5 to -1) coupled with a low reaction rate that allows time for penetration and translocation before the oxidation potential is exhausted. Within the plant, chlorate is apparently reduced by the same mechanism that reduces nitrate and the resultant chlorite and hypochlorite ions are known to be highly toxic. From the soil, chlorate ions are absorbed in the place of nitrate ions and the plants suffer distinct nutritional deficiency and finally die if the supply is maintained.

Thiocyanates are highly toxic.

The ammonium salt is very soluble, highly dissociated and corrosive on metals. The thiocyanate ion inhibits respiratory enzymes and may have a selective action in plant metabolism. Ammonium thiocyanate is a strong contact herbicide and a fair soil sterilant in acid soils. Upon decomposition it produces fertilizing effects upon plants, reflecting its sulfur and nitrogen content.

The toxic action of the ammates is not well understood. Sulfamic acid is a fairly strong acid. The ammonium salt is readily soluble, highly dissociated and somewhat corrosive. Ammate solutions kill by direct contact; in certain shrubby species such as poison ivy and poison oak, they translocate into the crowns and roots; they are absorbed from soils and bring about a delay in the normal spring break of dormancy. Cases on record show that, by repeated spraying, wild morning-glory was held in a dormant condition throughout a summer season and succumbed during the subsequent winter. Sulfamates and carbamates are an interesting group of chemicals having toxic properties that would seem to justify detailed investigation.

Borax is a chemical that has attracted much attention in recent years. Deficiency of this material in the soil results in a stunting of plants, disorganization of the meristems, chlorosis and much necrosis and, in severe cases, death. On the other hand, excess boron in the soil causes severe chlorosis, pithy swellings on stems, dieback on trees, and death to herbs. Borax has been used in large quantities in the control of *Hypericum perforatum* (St. Johnswort or Klamath weed) in western and north-western states. In alkaline solution it is a contact killer; the

bulk has been used as a soil sterilant with application in fall, winter, or early spring.

From tests on the relative toxicity of different boron compounds, it seems that the boron ion produces the injury; the various compounds are toxic in proportion to their content of elemental boron; toxicity is not related to peculiarities of chemical combination or molecular structure; decomposition is less important than fixation by the soil or precipitation in an insoluble form. The exact mode of toxic action for boron compounds is not known.

Chemicals of the above group, when used as contact sprays, are applied in fairly high concentrations and most of them dissociate to form strong acids, bases or ionized salts. They tend to break down the cuticle and penetrate the leaves and stems because of their high concentrations. They diffuse rapidly and because of their hydrogen or hydroxyl ion concentration, their content of heavy metal, or their very reactive character, they act as violent poisons on plants. For field scale application, fairly large quantities of these chemicals are required.

Soil Fumigants

ONE additional group of chemicals should be mentioned here, namely the soil fumigants, chloropicrin, methyl bromide, carbon disulfide, "DD," ethylene dibromide, and tetrachloroethane. These and other volatile organic liquids have been used to destroy insect pests and weed seeds in soils. Some of them, notably carbon disulfide, are able to kill the roots of deep-rooted perennial weeds. Though the exact mode of lethal action of these fumigants is not known, studies have provided information on their reactions with soils.

All of these materials are volatile and upon injection into the soil they vaporize and tend to replace the soil atmosphere. Chloropicrin and methyl bromide are very volatile and sealing of the soil surface with paper or a moist layer of soil is imperative if they are to be successful. Carbon disulfide is less volatile than the a-

bove fumigants but successful treatment requires sealing of the surface by moist soil or compacted soil to prevent excessive loss of vapor. Carbon disulfide is adsorbed on the surface of soil colloids, and so held in a form available to plants, yet more restricted in movement than the free vapor in the air spaces.

The fumigant "DD" has proved effective in killing the roots of perennial weeds, and, being less volatile and more strongly absorbed, loss in gaseous form is less than in the case with CS_2 .

Tetrachloroethane and ethylene dibromide are alike in being less volatile and more firmly adsorbed than "DD." These chemicals kill roots of perennial weeds but their movement through the soil from the point of injection is so restricted that very close spacing is required if complete permeation of the top soil layer by the vapor is to be accomplished.

Since sorption tends to tie these chemicals to the soil and restrict distribution, it is interesting to find that carbon disulfide, which is sorbed the least, will give a satisfactory distribution from 30 inch spacings; "DD" must be spaced 12 to 18 inches, and ethylene dibromide or tetrachloroethane 8 to 12 inches. Depth of kill of weeds with carbon disulfide may be 4 feet or more, with "DD" around 30 inches, and with tetrachloroethane or ethylene dibromide 18 to 24 inches.

All of these fumigants are organic solvents that penetrate living cells very rapidly. By bringing the polar halogen or sulfur groups into close relation with the protoplasm, the organic portions of the molecules probably promote their toxic action and render these fumigants the valuable reagents they are in pest control.

New Herbicides

INTRODUCTION of the substituted phenol compounds, 2,4-D, and the selective oils has greatly expanded the field of chemical weed control. With their extreme toxicity and sharp selectivity these materials have made possible methods that

greatly reduce production costs on many crops. And they enable growers to raise crops under conditions that a few years ago would have been impossible.

All these new materials are organic compounds of relatively low polarity. Compatible with the cuticle, they enter plant cells rapidly and completely. Being physiologically active, they are required in very small amounts. And because their action depends in most cases upon some unique and highly selective combination of properties, they may be highly toxic to some plants and relatively innocuous on others.

One of the first to be introduced was sodium dinitro-ortho-cresylate, the active ingredient in "Sinex." This material was for several years the leading selective herbicide for killing broad-leaved weeds in cereal, pea, flax, grass, and onion crops. More recently introduced are dinitro-ortho-cresol, dinitro-ortho-secondary-butyl phenol, dinitro-ortho-secondary amyl-phenol, and their ammonium salts. Pentachlorophenol and its sodium salt are also used. The parent phenols are soluble in oils, their ammonium or sodium salts are used in aqueous solution. The parent compounds serve as general contact herbicides, the salts as selective weed killers. Studies on the toxicities of the series dinitro phenol, methyl phenol (cresol), ethyl phenol, propyl phenol, butyl phenol, and amyl phenol proved that toxicity increased with increasing length of the side chain up to the butyl compound, and then dropped off slightly with the amyl compound. All side chains in this series were in the ortho position and above the ethyl substitution were branched (iso compounds). Pentachlorophenol is comparable in toxicity with dinitro orthocresol.

Dinitrophenol is a respiratory stimulant and the low dosages required of the substituted phenol herbicides suggests that they are acting as stimulants or possibly as enzymes for metabolic processes. Phenols are also protein coagulants and this reaction may explain their extremely rapid action under warm sunny conditions.

Dinitrocresol is effective when applied in oil solution; it is also effective applied as a dust. It kills by contact, with no evidence of translocation; because effectiveness is independent of the volume of spray solution used, apparently uniformity and completeness of distribution are the primary factors in its application as a weed killer. The butyl compound is an oily solid melting at about room temperature; the amyl compound is a liquid at ordinary temperatures. They may be applied in oil solution or emulsified with water; volume, again, is relatively unimportant except as it relates to obtaining a complete coverage.

These substituted phenols apparently enter the plant in the form of the undissociated molecules of the parent compounds, hence the oil solutions are highly effective. Next in order of effectiveness are the ammonium salts in aqueous solution. The sodium salts are distinctly inferior and require activation with acid salts to bring about maximum effects. Such "activation" increases the concentration of undissociated molecules of the parent compounds and accomplishes the same object as using the ammonium salts.

In using the aqueous solutions of the substituted phenol compounds as selective herbicides, much selective wetting can be had by using the straight solutions. Selectivity can be appreciably lowered by adding a wetting agent; and, where the ammonium salts or the emulsified parent compounds are to be used as general contact herbicides, a wetting agent definitely aids in obtaining a thorough coverage.

Whereas the salts of the dinitro compounds have been grouped together as selective weed killers with only the relative toxicities being given consideration, recent observations indicate the butyl and amyl compounds may have specific selectivities differing from those of the cresol compound. The higher analogs have proved particularly selective on peas, alfalfa, and vetch, and less selective on cereals. The cresol compound is more selective on grains and flax and

less on the legumes. These, however, are preliminary observations and need further study. The butyl and amyl compounds also proved less effective than the cresol salt on *Amaranthus* and *Chenopodium* species in onions when applied during hot weather in June.

The 2,4-D Compounds

WITH the introduction of dichloro-phenoxyacetic acid and its salts and esters, a new and unique group of herbicides has entered the field. Whereas most of the various compounds mentioned above kill by contact, and the translocated chemicals move in the sap stream of the xylem due to an abnormal physiological situation created by the spray treatment, 2,4-D is readily absorbed through the intact normal cuticle and moves about the plant as do naturally occurring hormones and foods. Only after the chemical has been present in the plant for some time do its subtle effects become manifest, resulting in sickness and death.

2,4-D has at least three distinct effects on plants. First, it causes a twisting and bending of stems and leaves. This results from differential growth rates in petioles, pulvini, and elongating regions of the stem that are specialized to produce growth responses when the orientation of the plant or some of its parts is changed. This growth response may be severe in plants that are little injured by the chemical; it may be less noticeable in plants that are readily killed.

The second pronounced effect of 2,4-D is a cessation of growth from meristems. This occurs in both stems and roots and may be very pronounced in the latter. The third and most important effect is death of cells, which often shows up first in the meristems and later spreads throughout the plant. Accompanying these changes in some plants may occur a yellowing or reddening of the leaves such as occurs in the autumn. This coloring is very prominent on poison ivy, poison oak, and *Lepidium latifolium*. Chemical analyses have shown a disappearance of starch and an increase in sugars in plants following 2,4-D application.

As is now well known, the 2,4-D compounds are highly selective, being relatively low in toxicity to members of the grass family and, with a few notable exceptions, very toxic to other plant species. As with other selective herbicides, specificity of 2,4-D is relative: at sufficiently high concentrations it will kill all species; at lower concentrations it will kill many of intermediate and low tolerance; some susceptible species are readily destroyed at concentrations as low as 500 ppm of the applied solution or at dosage rates as low as .4 pound per acre. Selectivity is not due to differential wetting but to protoplasmic tolerance resulting from inherent ability of certain plants to resist the toxic action of the chemical.

As with the dinitro compounds, the relatively non-polar parent dichloro-phenoxyacetic acid and its esters seem to be the most active compounds, followed by the triethanolamine salt, the ammonium salt, and finally, the sodium salt. Differences between these various compounds have not been as prominent as with the dinitros, possibly because the 2,4-D compounds have been used at dosages considerably above the threshold level; also because temperature has such an important role in the determination of the rapidity of action that differences may be obscured.

Like the dinitro compounds, the 2,4-D compounds are highly compatible with the cuticle and penetrate the leaf surfaces rapidly. Both types of compound have been successfully used as dusts, indicating that at standard dosage distribution is the essential factor; concentration of the applied solution is unimportant. Recent low-volume applications running as low as 0.4 gallons per acre, using both water and oil as carriers, confirm this conclusion. In contrast to the dinitros, once the 2,4-D has contacted the plant and been absorbed, it moves readily through the tissues and causes systemic symptoms. For this reason it is unique in its killing of perennial weeds. Apparently its downward movement through roots is polar as is that of hormones; vertical roots are often much more com-

pletely killed than horizontal laterals. This is definite proof of the hormone-like qualities of this chemical. These qualities are further evidenced by the fact that 2,4-D at extremely low dosage will induce fruit set and retard fruit and leaf drop.

Like other highly toxic chemicals, 2,4-D kills roots as well as shoots of plants, and if present in the soil may be fatal to plants. Experiments prove roots to be 10 to 100 times as sensitive as shoots to 2,4-D, hence small residues may prove disastrous. Decomposition of 2,4-D occurs most rapidly in moist warm acid soils; where summer rains are prevalent it may present no problem; where summers are dry, as in the southwestern and western states, 2,4-D has killed seedlings in soils containing this chemical as much as 6 to 9 months after its application.

Like other toxic chemicals, 2,4-D in small quantities in the culture medium produces a mild stimulation of plant growth. This coupled with the fact that the chemical may be leached from the soil, indicates that there is little danger of accumulation in the soil in toxic quantities provided proper attention is paid to the rate and time of application and subsequent management of the treated areas.

Research on 2,4-D and analogous compounds has shown that toxicity varies with chemical structure; more important, specificity also varies, and this presents the possibility that new selectivities may be found between crops and weeds. Potatoes, strawberries, coffee, and flax are four crop plants not belonging to the grass family that have shown tolerance for particular 2,4-D compounds, and 2-methyl, 4-chloro-phenoxyacetic acid has been reported as being more selective than 2,4-D. Because of the greater cost, 2,4,5-trichlorophenoxyacetic acid received but little attention during early work on 2,4-D, although it was known to be highly effective. More recently, interest in 2,4,5-T has revived, because of its effectiveness on certain woody or brushy species which are

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FERTILIZER MANUFACTURERS

Counter F. T. C. Charges

THE report of the Federal Trade Commission on the fertilizer industry made public at the FTC offices in Washington last month but still awaiting printing, has met with a mixed reception by the fertilizer industry. Some commercial interests have expressed considerable indignation, branding the FTC charges as completely unfair, and pointing out that industry policies in the formulation of mixed fertilizers are fixed by the state experiment stations which quite generally make recommendations as to what fertilizers farmers shall use, and that these recommendations are closely followed by commercial mixing interests in determining particular mixtures they offer in various states.

Other factors in the industry view the FTC report from a different angle, recognizing that the government bureaus have to keep themselves occupied to justify their existence to the taxpayers. They point out that the farmer has long been the "friend" of every elected or appointed government official, and they recognize a natural desire on the part of the FTC, and any administration which might be in power now or any other time, to impress upon the farmer its concern with his welfare and its desire to protect him from "greedy commercial interests." As one fertilizer manufacturer phrased it, "The fertilizer industry has been accused for years of trying to stick the farmer. This topic has always been, and unfortunately probably will always remain a political football."

Part of the industry, then, represents the FTC charges sharply. Others simply accept the fact that government agencies must always be engaged in what appears to be furthering the farmer's best interests. But

no one in the fertilizer industry encountered by *Agricultural Chemicals* in a survey over the past month dealing with reactions to the FTC report, agrees with FTC findings that the best interests of the farmer would in any way be served by a further encroachment of the government on the fertilizer industry.

The executive quoted above, president of a well known fertilizer company in North Carolina, points out that "in spite of all charges to the contrary, the industry has made steady progress in supplying farmers with fertilizers well adapted to their needs, and in most cases approved or recommended by state experiment stations.

"In North Carolina, the Fertilizer Grade List is prepared by state agronomists and research men and this list is submitted in open meeting to fertilizer manufacturers, farmers and other interested parties for full discussion. The trend to higher analysis fertilizers has been a natural evolution and, so far as I know, has never been opposed by anyone in the industry.

"The composition of many mixed fertilizers, however, is now approaching the point where no higher analysis mixtures can be made until the raw materials from which fertilizers are made are concentrated more than they are at the present time. There is very little room, if any, for filler in the analysis of fertilizers as they are now made.

"It would seem to me ridiculous to produce fertilizers of higher concentration, which would actually cost the farmer more per acre and would greatly increase the possibility of damage to plant and seed, but if this is what the farmer wants, and

the raw materials are available, we will be glad to make it for him."

This willingness to supply any product which the farmer wants, and particularly in any strength recommended by the state agricultural experiment station or authorized government agency, is echoed by a fertilizer manufacturer located on Long Island, N. Y. He cautions, however, that "until such time as the agricultural colleges and their experiment stations can prove to the farmer that a high analysis fertilizer is both economical and practical, there is little the fertilizer industry itself can do to hurry the change."

He points out that the farmer is prone to take the unsupported claim of the fertilizer manufacturer as high pressure salesmanship, citing a specific case from his own experience to illustrate. "About ten years ago," he recalls, "a company came on the island with a high analysis fertilizer, but without any prior research work, and no specific recommendation from the experiment station. The product was rejected by local farmers."

Commenting on varying compositions of mixed fertilizers used in the area which his company serves, he mentions that Long Island farmers have been using a 5-10-5 fertilizer on potatoes and cauliflower for the past ten years, which has given excellent crop yields. This past season, he adds, the local research farm has come out with a recommendation for changing the 1-2-1 ratio to 1-1-1, because the land has been demonstrated to require less phosphate.

His firm, he indicates, will make a small quantity of this product this season. Even if it proves practical for use in this area, however, it will take five to ten years, he believes, to

persuade any substantial percentage of local farmers that they should make the change from previous standards.

Socialistic Threat

THE serious threat to the American free enterprise system embodied in this latest proposal of the Federal Trade Commission to put the government further into the fertilizer business, in competition with private industry, is clearly recognized by an executive of a Florida fertilizer firm who offers the following comments:

"Those who seek the socialization of American industry have again improperly used a governmental agency to belittle and malign an honorable segment of the great American free enterprise system. In a voluminous report, the Federal Trade Commission allegedly recites its unbiased opinion of the fertilizer industry and yet, in over three hundred pages the industry is not given credit for one worth-while contribution to society. Every possible scrap of information or rumor derogatory to the industry, going back before the first World War, has been used in a feeble attempt to advocate the socialization of the fertilizer industry.

"The report insinuates two great evils of the industry—one, monopolistic barriers and, two, distribution barriers. Under monopolistic barriers, it goes back to 1870 to begin a dissertation on the evils of the German potash cartel. It goes back to 'many years prior to 1920' to relate the evils of the nitrogen cartel, and it minutely details the operations of a phosphate rock cartel beginning in 1919. After pages and pages of this ancient history, the report does admit that these conditions no longer exist, nor have they existed in the past ten years.

"Under the charge of distribution barriers, the author completely ignores that the farmer is paying his money for fertilizer and is, therefore, the final judge as to the grade of fertilizer which he receives, except where actual shortage of materials exists.

"Due to the necessity of price control during the war, the number of grades permitted in Florida was set at thirty-three. In a free market

in the year prior to the imposition of those controls, manufacturers registered and sold in Florida 899 different grades of fertilizer without consideration of the variation brought about by the inclusion of the so-called plant foods, which have been found to be of primary importance in this state. The elements referred to are: Magnesium, Manganese, Copper, Iron, Zinc, Boron, Sulphur, and several others. When the restrictions were

Your Opinion Wanted

THIS symposium will be continued next month. Our intention is to present as wide and representative a cross section of industry opinion as possible on this important question.—one of the most important that has faced the fertilizer industry in years. Has the fertilizer industry fallen down, as the F.T.C. charges, in developing high analysis fertilizers? What is the industry reaction to this charge—and to the balance of the F.T.C. report.

—The Editor

removed, the records of the State Department of Agriculture revealed that the number of NPK grades rapidly increased, and in the year ending June 30, 1949, numbered 440. This proves clearly that the farmer can buy any grade of mixed fertilizer that can be manufactured. In the report's plea for additional concentration, no importance is placed upon the necessity of proper distribution in the field, nor upon the importance of the inclusion of necessary secondary plant foods which, in many cases, use up several hundred pounds of the 2,000 comprising a ton. The report alleges that the producing plants should be closer to consuming areas without acknowledging that the use of fertilizer in the Midwest is a comparatively new venture. Under a free enterprise system, of course producing plants were placed with full consideration being given to source of raw material and cost of manufacture and distribution. As, until recently, the vast majority of all fertilizer was consumed in the Southeastern area, the

majority of the producing plants were built there to satisfy the existing demand; and if the industry will be relieved of these continued threats of socialization, plants will be built by private enterprise in every location that will economically support one.

"It is not physically possible to manufacture fertilizer containing plant food in even units (fractional guarantees are not permitted by state law) with ever-varying analyses of raw materials without the use of some so-called filler. The statement that a fertilizer containing twenty units of plant food contains also eighty units of inert material is just as ridiculous as saying that this three pounds six ounce report contains two ounces of words and three pounds four ounces of paper and that the words are all that count and the paper should be saved.

"Thanks to the magnificent job done by the fertilizer industry the agricultural production of this nation is at an all-time high, and only socialization of the industry can stop its continued progress."

What Is High Analysis?

WHAT is a high analysis fertilizer? a Kentucky manufacturer asks. And he supplies some of the answers to his own question. "To most people in Mississippi," he notes, "it means 6-8-8; in Indiana it means 3-12-12 or 3-9-18; in Kentucky 4-12-8. Most people in the industry think of a grade as 'high' when little or no filler such as dolomite or sand need be added."

And the vast majority of firms in the fertilizer industry, he affirms, prefer to make and sell that type of "high grade" product for three reasons:

1. They can be made with usually plentiful, lower unit-cost straight materials. Concentrated materials are often premium priced and of spotty supply.
2. Such grades of complete fertilizer are of more dependable good mechanical condition, than unusually high grades.
3. These grades do not require us to buy, handle and prepay freight on inert fillers for which we get no return.

"We feel that the market for such high grades as mentioned above

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Food and Drug Adm. Hearings Establish

Insecticides are Necessary

By John D. Conner

AFTER a recess of approximately two weeks, the spray residue tolerance hearing before the Federal Food and Drug Administration resumed in Washington on February 13. Fred L. Overley, superintendent of the Tree Fruit Experiment Station, Wenatchee, Washington, was first to appear as a witness. His testimony dealt with insects and diseases affecting fruit in Washington and pointed out the necessity of controlling with chemicals, the insects and diseases that attack fruit, so that produce acceptable to the consumer may be grown.

Mr. Overley discussed the spray recommendations made by research workers of the western states and western Canada from 1939 to 1950, and summarized the residue data obtained from the use of specific chemicals. Before the advent of DDT and parathion, he said, both the fruit and trees themselves suffered some damage not only from the insecticides in use then, but also from the washing processes necessary to remove residues. With the introduction of the new insecticides into the picture, such injury has been reduced greatly, he indicated. However, he continued, recommendations have included sparing use of DDT because of the possible damage to soil resulting from the continued use of the material.

Another witness, William J. O'Neill, also from the Wenatchee Station, reviewed experimental work in the states of New Jersey and Washington in the control of pests and diseases affecting fruit. He reported that these experiments revealed biological control as a supplement to chemical control and stated that commercial fruit crops cannot be produced without the use of sprays. The grower must have a wide choice of insecticides to meet varying infestations, he declared, and expressed serious concern at the possibility of

regulations restricting this choice by the grower.

Kenneth C. Walker, Washington State College presented residue determination data on specific insecticides on a variety of fruit. Analyses in these cases were made for both washed and unwashed samples. In handling apples and pears for shipment, the usual course is to wash the fruit, and residue analysis is frequently made before shipment, he said. This work is ordinarily done by commercial laboratories.

Don C. Mote, entomologist in charge of the Oregon Experiment Station, discussed the more important insects of vegetables and fruits in Oregon and the insecticides used for their control. He emphasized that the Experiment Station withholds recommendation of insecticides on vegetables and specialty crops until it has collected experimental data of two or more years covering the effectiveness of control, hazards involved and residues likely to be encountered in the use of these pesticides. He reported that in experiments to determine residue hazards on certain crops that the analysis is 1 p.p.m. or less, and that there is no practical method for the removal of chemical residues from vegetable and specialty crops.

Aden P. Steenland, assistant plant pathologist of the Oregon Experiment Station, continued the testimony in discussing leading diseases affecting fruits and vegetables. Mr. Steenland declared that prevention, rather than eradication, must be depended upon to control plant diseases. On cross-examination, he described in detail the damage which would be done by each of the mentioned plant diseases, if allowed to be uncontrolled. Although the Experiment Station makes specific recommendations for control of plant diseases, growers often use fungicides

other than those recommended, because of convenience.

Leroy Childs, superintendent and entomologist of the Hood River Branch, of the Oregon Experiment Station, discussed insect pests and their control on stone fruit. He stated that when apples are washed at temperatures high enough to assure residue removal, the wax is also damaged, leaving the apple susceptible to various diseases. This procedure has the further disadvantage of shortening the life of the fruit with a consequent difficulty in obtaining a good return, he said. He continued by saying that the economic solution of the residue problem does not rest in a washing process. It must go back further than that.

H. C. Compton, grower of small fruits and vegetables in Oregon, covered insects affecting these crops and controls used. Mr. Compton stated that no ruling should be made to eliminate the use of any insecticide that might give effective control of pests, providing adequate residue control can be maintained.

Allen B. Lemmon, Chief of the Bureau of Chemistry, California State Department of Agriculture, covered spray residue analyses on a variety of fruits and vegetables from 1938 to date. He outlined provisions of California's spray residue law and listed tolerances permitted of various insecticides, applied to all fresh and dried fruits or vegetables offered for sale in California. He recommended that tolerances set by Federal Government be not lower than present California tolerances which he believes are adequate for conditions existing in his state. Under the present California law, a higher tolerance than that now in effect may be established if a federal agency so specifies. Mr. Lemmon suggested that tolerances similar to those now applying should

be established for spray residues of other pest control materials, also.

William M. Hoskins, chemist of California Agricultural Experiment Station, described major pests affecting fruits and vegetables produced in California together with insecticides used to control these insects. He discussed the deposit and residues

of the newer insecticides resulting from various control practices.

Dr. Alvin J. Cox appeared on behalf of the California Fruit and Vegetable Industry Committee. He discussed the minor specialty crops grown in California and the insect problems affecting these crops, as reported separately below.

new materials would have to be discovered faster."

Dr. Cox went on to say that even if it were possible to develop a single insecticide for all purposes, there is a serious question whether such would be desirable. He pointed out that since this one material would have to be used in so many food products and in so many habitats, this would mean that the insect would have frequent contact with the insecticide. On the contrary, the use of a large variety of products for control of pests tends to minimize the contact with any particular one. The impossibility of developing and evaluating new products or materials every two or three years was emphasized, and he said

(Turn to Page 89)

Dr. Cox Tells FDA: "NO PESTICIDES—NO FOODSTUFFS"

THAT "nowhere can acceptable fruit and produce be grown without insecticidal and fungicidal sprays and dusts," was the main point of testimony by Dr. Alvin J. Cox before the Food and Drug Administration Hearing in Washington, on February 21. Dr. Cox, retired chief of the California State Bureau of Chemistry, is spokesman for a number of west coast growers at the hearings.

"It is absolutely necessary to use economic poisons to protect a crop during the growing season, or we do not have these foods," he declared. "If the supply is reduced on account of increased culls, the price will be so high that only the wealthy can have proper nourishment. Growers will be raising untold quantities of insects instead of producing food," he continued.

"The fact is that since climate, seasons and market conditions vary so widely in different parts of the country, requirements for pest control can hardly be uniform. The materials used for control must be selected both for the pest involved and for the weather conditions," it was pointed out. In view of this, Dr. Cox stated "Limiting the kinds of insecticides which may be used would enhance the possibility of insects of economic importance becoming partially or totally resistant to those insecticides used. There are many instances in which materials at first afforded excellent control of a particular pest, but later failed to control it. It is easy to visualize the changes that may occur in the next few years if insects continue to develop resistance to various insecticides used to control them. The recognized effective insecticides should be alternated and kept

useful as long as possible. If there is a residue problem, there is an advantage to the public health in alternating them. Without an opportunity to use alternate pesticides, the resistance of pests builds up more rapidly and

Minor Specialty Crops

Crop	Pest	Treatment
Almonds	Clover or almond mite	Parathion
Avocados	Avocado brown mite	Sulfur dust
Broccoli	Imported cabbageworm	Rotenone, Pyrethrum, DDT Cryolite or Calcium arsenate
Cactus	Cactus fruit gall fly	?
Cauliflower	Cabbage looper	Pyrethrum, DDT, Cryolite, or Calcium arsenate
Chestnut	Chestnut weevils (<i>Curculio proboscideus</i> or <i>C. auriger</i>)	DDT spray
Chicory	Cabbage looper	Pyrethrum
Chives	Onion thrips	Nicotine sulfate
Dates	Nitidulid beetles	No Satisfactory treatment
Eggplant	Flea beetle	Rotenone
Escarole	Cabbage looper	Pyrethrum
Filberts	Filbert worm	DDT or Lead arsenate or dust
Guavas	Black scale	Oil sprays
Loquats	Green apple aphid	Nicotine sulfate
Mango	Red spider (<i>Tetranychus yotheri</i>)	Parathion spray
Papaya	Papaya fruitfly	DDT—Sulfur dust
Parsley	Parsley caterpillar	Pyrethrum
Pecans	Pecan weevil	DDT spray
Peppermint	Mint flea beetle	Cryolite or DDT
Persimmon	Fuller's rose weevil	Lead arsenate spray
Pimentos	Pepper weevil	Cryolite or DDT
Plums (2100 varieties)	Aphids (several species)	Dormant oil or nicotine sulfate
Pomegranates	Citrus whitefly	Oil sprays
Shallots	Onion thrips	Nicotine sulfate
Spearmint	Mint flea beetle	Cryolite or DDT
Walnuts	Codling moth	Lead arsenate or DDT spray
Yams	Sweetpotato leaf beetle	Cryolite

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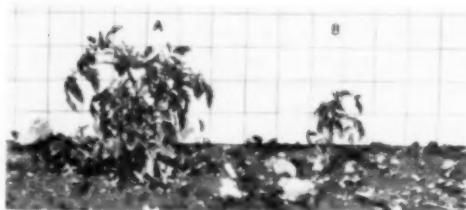
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See what others say!

Reprint of an article by Jerry Krueger, Farm Editor, which appeared in the April 15, 1949, issue of the Benton Harbor, Michigan, NEWS PALLADIUM.

See the difference in the field!

In the photograph, both tomato plants were set out at the same time. The one on the left was transplanted with $\frac{1}{2}$ pint of Take-Hold solution and the other was transplanted with $\frac{1}{2}$ pint of water only. Three weeks later this photograph was taken at the N. Y. Agricultural Experiment Station, Geneva, N. Y.



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Nutrient	TO AUG. 31		TOTAL YIELDS	
	Tomatoes Tons per Acre	Tons Acre Gain	Tomatoes Tons per Acre	Tons Acre Gain
Water Only.....	2.07	12.98	...
"TAKE-HOLD" [*] (3 lbs.).....	3.44	1.37	13.83	.85
[*] 3 pounds per 50 gal. water applied at rate of $\frac{1}{2}$ pint per plant.				
Courtesy N. Y. State Vegetable Growers Assn.				
[*] Equivalent: One ounce (2 heaping tablespoonfuls) per gallon of water.				

*for reduced replanting . . . earlier resumption
of growth . . . earlier, more productive harvesting*
Treat Tomato Plants and other Set-Outs With

Special 'Dope'

Tomato Expert Tells How Plants Can Ignore Cold

By special request, Dr. S. H. Wittwer, MSC vegetable specialist, this week provided a repeat explanation of the method he found in his experimental work last season that will keep young transplanted tomatoes growing rapidly in the field during cool weather.

He had told his finding to a small group of growers after a vegetable growers meeting here late last summer, and attracted considerable interest.

BIG PHOSPHATE USERS

In a special report received here this week, Wittwer explained the chief reasons young tomato plants make practically no growth during cool weather in the spring is that the cold soil makes phosphate almost unavailable to the plants and also because the root system of the newly-set plants are small and unable to gather much plant food. Tomato plants are heavy users of phosphate, he said.

He found, however, in tomato trials at East Lansing last summer that application of a special high-phosphate-content fertilizer in a water solution made the plants begin to grow when they were set into the field and continued to grow well right through cool weather.

The special fertilizer has an 11-52-17 analysis and is completely soluble in water. It is manufactured under the trade name of Take-Hold by the Victor Chemical com-

pany, Chicago. Wittwer said he knows of no other commercial fertilizer that is water soluble and has such a high phosphate content.

Using this special fertilizer on an early hybrid variety of tomato, and employing the tomato hormone spray to induce early fruit set, he produced ripe tomatoes as early as July 2 at East Lansing last year. This was about two weeks earlier than in check plots that were of the early hybrid variety and had the hormone spray but did not have the special fertilizer application.

TELLS FORMULA

Wittwer said he mixed the fertilizer at the rate of one ounce in one gallon of water, or six to eight pounds in 100 gallons of water. He sprinkled this solution on the soil around the roots of boxed plants shortly before transplanting them into the field, using one-half to one pint per plant, depending on how much the soil around the plant would absorb.

He explained it is important to leave the saturated soil around the plant roots when they are set out. If the soil is not left with plants, the solution can be poured directly around the roots after the plants are set in the field.

Cost of the special fertilizer last year was 15 cents a pound or \$13 per hundred pounds. He said he has not checked yet to see if there is change in the price this year.

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**Midwest Shade Tree Conference
features talks and discussions on**

Insecticides Fungicides Herbicides

by

H. H. Slawson

NEW developments in chemicals for control of insect pests and diseases of trees were reported at the fifth Midwest Shade Tree Conference in Chicago, February 15 to 17. Weed control chemicals were also discussed and a spirited debate was held on the controversial subject of organic vs. inorganic fertilizers.

Sponsored by the Midwest chapter of the National Shade Tree Conference, the meeting drew an attendance of 352 commercial arborists, scientists and others, both men and women, interested in promotion and preservation of shade trees.

Dr. H. M. Harris of the department of zoology and entomology, Iowa State College, Ames, Ia., in the principal survey of new chemicals of interest to tree men, drew a bright picture of the future. Recent developments, he said, have provided means whereby, for the first time, chemicals can be used in forests over a wide area. Costs have been lessened and foresters can now think of effective insect control where previously this had seemed impossible.

Two outstanding factors were found by Dr. Harris in the improved situation, these being the revolution in application machinery and the expansion of pest-control and custom service designed to fit the job. The old conception of one general all-purpose insecticide is no longer tenable, he continued, and has been replaced by an array of products specifically intended for use against given species.

He emphasized, however, that it is still necessary to read the labels, follow manufacturers' recommendations and if in doubt, to ask questions from state college authorities. Applicators must, more than ever, note caution warnings and adhere to them.

Dr. Harris reviewed insecticide history, reminding that chemical control of insects goes back to the year 1,000 B. C. when Pliny the Elder wrote about sulfur and fumigation. Introduction of Paris green for control of Colorado potato beetle, 80 years ago, really started the interest in agricultural chemicals, but it was the recent war, with its emphasis on DDT, that stimulated wider use of insecticides, and also encouraged a broad program of research. In the past five to seven years, more progress has been made than in the previous 500 to 700 years, he said.

"It takes time," Dr. Harris went on, "to learn the potentialities and limitations of a new insecticide. We still do not have all the answers, on any one new material and this is especially true on their use against tree pests."

Some features of the new insecticides, he said, have brought many headaches to both entomologists and manufacturers. In view of the hearings involving these materials now under way in Washington, he advised against "rushing new products to market before adequate testing." This procedure, he declared, will do only harm, and, as to the entomolog-

ists, they will hold to products of which they are sure.

While DDT has many known characteristics, including its potency and residual effect, its chronic toxicity and the effect on plants of emulsion concentrates and oil sprays are still being explored. Arborists were therefore advised to use these formulations with care.

He reported excellent control of sawflies on pines and evergreens, by use of DDT, but because the caterpillars are tough, he advised early treatment when the larvae are young. He also cautioned about watching for buildup of red spiders and certain aphids.

Chlordane, Dr. Harris said, is effective against some worms where DDT may fail. For bagworms dosage must be stepped up three to four times above amounts of older insecticides, formerly used against them. He also reviewed use of lindane, BHC, "Aranite," "EPN 300," and other products found effective against specific tree pests. For control of scale insects, he said timing of applications is critical and on that point much testing of the new insecticides must still be done. He commended DDT use on soil infesting grubs and larvae and on tree borers, especially the elm bark borer. For ants on lawns and in wood, chlordane, he declared is a "wonderful" insecticide.

In a talk on "New Herbicides and their Use," L. L. Coulter, agronomist with Dow Chemical Co., South Haven, Mich., concentrated on three products of interest to arborists, namely 2,4,5-T, "Sodium T C A" (sodium trichloroacetate) and methyl bromide.

The first named, 2,4,5-T he said, is a highly volatile, low concentrate spray primarily valuable as a brush killer. It is not meant to replace 2,4-D, but will take care of certain species resistant to 2,4-D such as blackberry, osage orange, poison ivy, etc. For an effective kill, leaves must be kept in good condition until the poison gets into the plant, he explained. While this is difficult with high concentrate sprays, the new low-concentrate character of 2,4,5-T overcomes this drawback, he claimed. It is

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not a permanent soil sterilant but how long it remains in the soil depends on rainfall, soil temperature and other factors.

Applied to aquatic plants, the effect of 2,4,5-T is about the same as 2,4-D, he stated, but a high concentration is required in water. This does not affect fish life, but he warned that it might cause complications "if somebody down stream is pumping water onto his tomatoes." Operators must also still concern themselves with drift in air, he said.

The new "Sodium T C A," Mr. Coulter went on, is primarily for grass control. It is absorbed through the roots and its effectiveness is related to soil moisture at time of application. It gives good control of quack, Bermuda, Johnson, Para, and Kentucky blue grasses, but does not control broadleaf weeds. It is recommended for use on rights of way, parking lots, bridle paths, etc., and farmers, also, can use it in fields, if applied with tillage.

Methyl bromide, Mr. Coulter said, is not for general field use, but intended for intensive areas, like forest seedling nurseries. Packaged in containers under high pressure, it has tremendous penetrating power and must be applied under gas-proof tarpaulins. It controls seeds in organic soils, also wire worms, nematodes, and other soil organisms, but must be applied when soil is well pulverized or otherwise in good seedbed condition. If soil is moist, good control results. The chemical does not remain long in the soil, so that other seeds may later be washed in and germinate. In Kentucky tobacco beds, the best time for killing weed seeds has been found to be in the fall. It also works well against seeds in compost piles, two to three feet high.

Midwestern oak and elm trees may be facing something as calamitous as was the chestnut blight, Dr. J. C. Carter of the Illinois Natural History Survey, Urbana, Ill., declared, in reporting on the status of two tree diseases, oak wilt and phloem necrosis of elms, now infesting midwestern states.

Dwelling particularly on his own work with phloem necrosis, Dr.

Carter told of one Illinois town, Mt. Pulaski, which had 600 elm trees when the disease first showed up there. Today, he said, it has 19 live elms. At Lincoln, Ill., infected trees increased from 9 in 1945 to 400 last year. At Mattoon, Ill., the number of diseased trees grew from 6 in 1945 to 500 to date. In Urbana, only two infected trees were found in 1944, four in 1948 and 99 last year.

Only hope for checking phloem necrosis, he said, is use of DDT against a leafhopper which spreads the virus. This requires a high concentrate spray applied with high pressure hydraulic equipment to reach the insect on the leaf's under side. This is expensive and does not cure the disease, but merely reduces for a time the population of this insect vector of the virus.

Fungicides Reported

SPEAKING later on "Effective Fungicides," Dr. Carter told of the hunt by scientists among thousands of new chemical compounds, to find those with potent fungicidal properties. Better than 100, he said, have been tested and only a few have been proven effective for fungus control. These act only as protectants, and do not cure the trouble. At the Illinois station, he stated, thirty-two materials are being tested and from these he selected three—"Puratized agricultural spray," "Fermate" and "Elgetol," for detailed report on accomplishments with them.

G. W. Flint, development chemist in Standard Oil Co's Chicago research department, in a paper on "Development of Chemical Formulation," presented an account of the efforts made by manufacturers to develop and test new products before placing them on the market. At every step, he said, close cooperation is essential between the company chemists, entomologists, horticulturists and botanists. He pleaded for continuation of this helpful relationship.

In Thursday morning's debate on "Organic vs. Inorganic Fertilizers in Tree Feeding," Paul Pfund, Elmhurst, Ill., a leading national exponent of organic farming, pointed out that, while tremendous progress has been

made in biological sciences, very little is yet known about soils and what constitutes rich earth.

Soil, said Mr. Pfund, is a factor in tree diseases but tree men, he charged, feel that it is easier to spray the tops than to dig down and find out what's wrong with the roots. Describing certain situations, he asserted that there are inviolate laws working and these must be discovered. Then, if operations are conformed to the new knowledge, progress will be made as never before.

"Only that which possess life," he continued, "can impart life. You cannot impart life to chemicals, so they in turn cannot impart life. My conviction is growing stronger and stronger that chemicals have no place in the soil.

"All of us are concerned with soil conservation, but we need a new vision of what constitutes conservation. Machines and methods, like contour plowing, add nothing to the soil. Conservation goes deeper and I believe it is concerned with the conservation of all organic residues. We try to cure our trees symptomatically instead of constitutionally, so we do not get at the roots of the trouble."

He told of his experiences with organic farming in Florida where narcissus bulb fields were free of eel worms, although adjacent fields were heavily infested. The difference, he claimed, was due to his practice of growing cover crops and plowing them in to provide proper, natural environment for the worms.

R. Milton Carleton of Vaughn's Seeds Stores, Chicago, admitted that he has a big compost pile on his suburban residence property and would like more of the same. On organic fertilizer, however, he had a more conservative view than Mr. Pfund's. The question, he said, is not, which is good or bad, but why should women and children be taught to "see a death's head in every cabbage," and he told that chemical fertilizers are "immoral."

Radio active tracers have shown that there is no difference between nitrogen from organic and inorganic sources, once they get into

(Turn to Page 91)



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In one area, where white flies on pole beans presented a serious problem, it was established that a dilute dust containing parathion was the most effective for white-fly control. Arizona growers report excellent control of stink bugs on tomatoes, and from Texas comes the report, "I have used parathion and it gives wonderful results on aphids and squash bugs and beetles."



NOT ONLY CELERY, but many other vegetables go to market free of insect damage when treated with parathion insecticides well in advance of harvest. These insecticides afford excellent control of insects attacking celery and are unusually effective against aphid and leaf tier.

In one particular test in a New York State bean field, a parathion dust was applied by plane for bean-beetle control. "Nearly perfect control" was the report from a Cyanamid field representative. "On three bean plants we counted 33 dead larvae and only 1 live one. In checking over the field for about 1 hour, we found only 2 live larvae in the entire field..."

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These precautions are stated explicitly on every container of parathion insecticides. They must be read carefully and observed strictly to avoid accidents.

It is urged that work crews who are given parathion to apply be fully advised also of the necessity of observing these precautions.

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WASHINGTON REBOUNDS

SHADES of WPB days! Washington is jammed to the scuppers with insecticide, fungicide, and fertilizer folks just like back during the hectic days of World War II. All are here for the insecticide hearings, and little did we ever suspect that so many people were interested in insecticide residues. With occasional adjournments, called, we feel, to permit participants to catch their breath and maybe a nip of scotch too, they may go on for as long as nine months or more. And that's long enough for something substantial to be produced in the way of results. Our authority, Ingrid Bergman.

* * *

Though it is a little difficult to see how fertilizers fit into a hearing which we thought was to be restricted to products leaving a "residue" on fruits or vegetables, they are going to slip in via the back door, we are told. Dr. William Eyster representing "Organic Gardening" magazine, is to testify around mid-April, according to the present schedule of witnesses. Presumably he will repeat the pet thesis of this group, which, stated briefly, is that healthy plants are not subject to disease nor to insect attack. Recalls to our ears a song popular back in '33. Presumably, as in the song, when a plant is healthy, nurtured by natural organic fertilizers, instead of the unnatural store-boughten type, "the bugs fall off the vine." Personally, we're still a little skeptical. Didn't locusts eat up the crops in ancient Egypt long before the days of chemical fertilizers?

* * *

While on this theme, may we pause to admit that our own face is a little red after re-reading our editorial in January, belaboring Louis Bromfield for adherence to the organic theme. Called to our attention is a talk Mr. B made at the NFA convention last June in which he observed "it is impossible for this country to do without chemical fertilizer . . . these people who believe only in organic farming, who say everyone will be poisoned by chemical fertilizers, are essentially wrong." Our

apologies, Mr. Bromfield. Clearly a case of mistaken identity.

* * *

A new book by Dr. Wm. J. Hale, "Farmer Victorious," is what we must have been thinking of. Dr. Hale charges that "the presence of any appreciable quantity of synthetic fertilizer destroys the vitality of the mycorrhizae and thereby contributes to diminishing plant vigor and opens the way for attack on the plants by insect pests." To support this view he cites the experience of Lady Eve Balfour who grew food on soil fertilized with organic fertilizers alone and "found herself comparatively freed of colds and even rheumatic pains, to which she had formerly been subject." Such unsupported evidence may convince those who wish to be convinced, but it sounds a little incomplete and unscientific to us. In spite of Dr. Hale's apparent fear that chemical fertilizers may "gradually contribute to a degeneration among our plants," we have a feeling that a lot of people around the world would starve mighty fast if we suddenly stopped using these chemical aids to food production.

* * *

Reverting back to Dr. Eyster and his approaching appearance before the residue hearings, we predict that the newspapers will suddenly "discover" the hearings about the time someone announces that we are rapidly being weakened through use of chemical fertilizers, or done in foully by use of poisonous insecticides. The daily press seems largely to have ignored the solid testimony to date, which has pointed out in strong terms that we have a straight choice between insecticides and starvation. But we predict yards of space when witnesses with some of the more sensational testimony get to the stand.

* * *

Switching from the residue hearings over to the FTC charges against the fertilizer industry, we hear that actual printing of the 300 page report may be long delayed. So long, as a matter of fact, that one of the fertilizer associations is reported considering underwriting an unofficial edition of the report itself, so the industry may find what it is charged with in this imposing document.

Many of the answers to the FTC charges, incidentally, are contained in a little booklet issued a couple years back by the American Plant Food Council under the title, "Facts About Proposed Fertilizer Legislation." A few copies may still be available through the APFC offices.

* * *

A sample of the job the National Fertilizer Association is doing for the industry is the "Farmer's 1939 Dollar Bills" which it has printed and distributed by the thousands. These paper bills, in the shape of U. S. greenbacks, point out that while the 1939 dollar today buys only 33c worth of seed, 44c worth of food, 52c worth of feed, etc., it buys 64c worth of fertilizer! Truly an excellent, honest and readily understandable promotion job for the industry.

* * *

Another shot from the same barrel is the set of posters which the NFA has had printed for use by dealers in boosting fertilizer sales. (Pictured on page 77 of this issue) See, too, the story on the NFA's booklet "A Century of Progress With Fertilizers" (Reviewed on Pg. 83). The industry admittedly has a job to do in countering the propaganda put out by various government agencies, and the job is being done.

* * *

We have always been a little sore, understandably perhaps, at a government agency using our own dough to propagandize us,—the theme of their propaganda efforts usually being how much better said government agency can serve us than the faltering efforts of private industry which only built the country and support the government. All of which reminds us that the 1950 budget for the TVA includes a tidy little item of \$165,000 for an information staff, including technical library service. We are advised that in the requested '51 budget this item will grow, as all government expenses always grow,—to \$180,000. "We can't afford that kind of dough for our own industry efforts at educating the consumer,"

(Turn to Page 89)

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Suppliers' Bulletins

New Nozzle Announced



Spraying Systems Co., Bellwood, Ill., have developed a new "Diaphragm Teejet Nozzle" for use in agricultural spraying where concentrated sprays are desired. The makers state that the assembly is a spray nozzle and check valve built as one unit. When pressure is shut off, a spring-loaded diaphragm makes a tight seal closure, stopping the flow. Since the valve is a part of the nozzle itself, complete shut off is effected so that there is no dripping. For full information, write for data sheet 4664 from the company, 3230 Randolph St., Bellwood, Ill.

Chlordane Bulletin

Velsicol Corp., Chicago, has issued a new bulletin #35, describing the use of chlordane in control of alfalfa weevil. Copies are available from the company, 330 E. Grand Ave., Chicago 11, Ill.

Offers Safety Fabric

Standard Safety Equipment Co., Chicago, has announced the development of "Gra-Lite" fabric, resistant to a wide range of chemicals, to be used in protecting handlers of chemicals. According to the makers, the new fabric provides "greater resistance to a wider range of chemical hazards." With this material, it is claimed that garment seams may be completely sealed over to prevent seepage, and that the material is 40 percent lighter than the ordinary im-

pervious fabric and is flexible even under freezing temperatures. Sample swatches for testing and descriptive literature are available from the company, 232 W. Ontario St., Chicago 10, Ill.

Folder on Parathion

An illustrated folder detailing instructions for safe handling of parathion by formulators, distributors and customers is available from Monsanto Chemical Co., St. Louis. Step-by-step advice for handling drums, house-keeping in formulating area, application and about protective equipment are included. The folder also contains first aid instructions and information for use of physicians in case of accidental poisoning.

New Dobbins Catalog

Dobbins Manufacturing Co., Elkhart, Ind., has recently issued a new catalog which illustrates and describes its 1950 line of hand sprayers and dusters, as well as garden and estate power sprayers. Write for Catalog No. 48N.

High Clearance Sprayer

Ekholm Mfg. Co., St. Paul, Minn., has developed a high-clearance sprayer designed for control of corn borer in tall corn. The U. S. Department of Agriculture European Corn Borer Research at Toledo, Ohio, has

Hand Sprayer Offered

A new "Handi Sprayer" has been placed on the market by James Varley & Sons, Inc., St. Louis, Mo. The sprayer is operated electrically, with precision machined brass bar-



The "Handi Sprayer"

stock, adjustable nozzle which can be set for fine, coarse or straight stream ejection. The device is 8 inches high, five inches deep and 4 1/4 inches wide. For literature, write James Varley & Sons, Inc., 122 Switzer Ave., St. Louis 15, Mo.

been experimenting with one of these units for the past year. The machines are powered by regular tractor motors and transmissions. Descriptive literature may be secured from the company, 436 N. Smith Ave., St. Paul 2, Minn.



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The Listening Post

Observations on Plant Disease in Alaska

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



DURING the growing season of 1948, the four main agricultural sections of Alaska, namely the Fairbanks, Matanuska Valley, Anchorage and Homer areas, were surveyed for plant diseases. Since the potato acreage was greater than that for any other crop, and as the economy of many farmers depended so much on the potato, special attention was given to this crop. Findings were reported by C. L. Lefebvre of the U.S.D.A., who made the survey for the Alaska Agricultural Experiment Station.

Most of the potatoes are planted in Alaska by June 1 so that diseases are not much in evidence until the latter part of June. The Fairbanks area was first surveyed and the most common disease in the early season appeared to be blackleg caused by a bacterium, *Erwinia phytophthora*. The severity of the disease varied from a trace in most fields to nearly 10 percent in one field. Later in the season, counts revealed that four fields had an average of around 5 percent blackleg, and in one field 25 percent of the plants were infected. Traces of the mild and rugose mosaic virus diseases were found in every field of potatoes. In one 55-acre field, about 25 percent of the plants showed mild mosaic and 50 percent rugose mosaic. At digging time this field produced around 125 bushels of potatoes per acre while the best field in the area produced approximately 330 bushels per acre. This difference in yield, however, cannot be attributed entirely to the heavy virus infection because this

field was also comparatively badly infested with lambs-quarters weed, one of the most troublesome of the territory. Traces of spindle tuber, another virus disease, were found in several fields, but this did not seem to be an important disease of potatoes in Alaska.

Rhizoctonia disease caused by the ubiquitous fungus *Rhizoctonia solani* was also found in all fields in the Fairbanks area, but in no field were over 5 percent of the plants observed to have cankers. In one late-planted field it appeared that the stems of nearly all plants were covered with the grayish, perfect stage of the fungus for three or four inches above the surface of the soil. Very little injury from *Rhizoctonia* was observed in this field, but if potatoes were grown on this land again the following year, as was likely, this abundant inoculum could well produce heavy infection.

The *Verticillium* wilt fungus was isolated from plants of the variety Teton. The two-acre field from which these plants were taken was new land planted with certified seed obtained from the States. This appeared to be the only field observed that showed an appreciable number of plants with symptoms of this wilt.

According to several farmers in the Fairbanks area, ring rot caused by the bacterium *Corynebacterium sepedonicum* was first observed in 1945, and by 1947 several farmers lost at least 50 percent of their potatoes from this disease. Ring rot was the direct cause of several farmers going out of the potato growing busi-

ness in 1948. Traces of ring-rot infected plants were found in only two fields in the Fairbanks area in 1948, although it was known that additional fields had been planted with ring rot-infected potatoes. The frost that occurred on August 18 killed the potato vines in most fields, making it impossible to detect ring rot-infected plants. At digging time, however, 20 percent of the tubers in one field were found to have ring rot when the gram stain technique was used. In another field, 8 percent of the tubers were infected. At the end of October two other farmers each sold a bin of potatoes containing 18 tons of tubers, but after grading, 11 tons were discarded for various reasons, including decay from ring rot, and probably blackleg and secondary rots as well. From these examples it can be seen clearly that ring rot is an important and destructive disease of potatoes in the Fairbanks area.

Other crops appeared to be comparatively free of diseases, but scab (*Streptomyces scabies*) was found on radishes; leaf mold (*Cladosporium*) on leaves of greenhouse tomatoes; (*Helminthosporium avenae*) and smut (*Ustilago avenae*) on oats; leaf spots (*Scienophoma bromigena* and *Helminthosporium bromi*) on brome grass; and black stem (*Ascochyta imperfecta*) and leaf spot (*Pseudopeziza medicaginis*) on alfalfa.

In the Matanuska Valley, ring rot of potatoes was found for the first time in 1948 in trace amounts on seven farms. In April, 1949, it was found on two additional farms in potatoes to be used for seed. Thus it seems that ring rot is getting started in this major agricultural area of Alaska, and consequently every effort should be made to prevent the spread of this important disease. Thus far, ring rot has not been serious in the Matanuska Valley, while blackleg has been the more destructive of these two diseases. In a 45-acre field where blackleg was unusually severe, there were several small areas of one-half acre or less where up to 50 percent of the plants were infected. Over the whole field, however, the number of infected plants was probably not over 2 percent.

Pittsburgh Agricultural Fungicides



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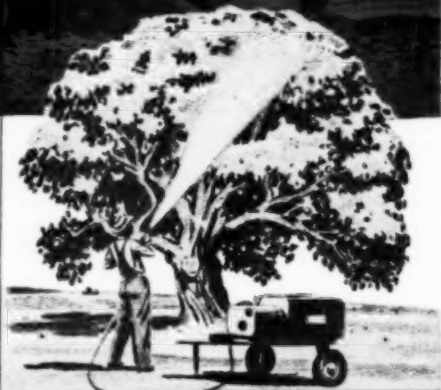
A safer, better seed protectant

Pittsburgh Spergon-sl is a non-metallic organic chemical fungicide . . . a highly effective protectant against the harmful fungi that cause seed decay and "damping off" of plants in the early post-emergence stage. Spergon-treatment of seeds, prior to planting, largely prevents seed and crop losses, as well as delays caused by necessity for reseeding.

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Pittsburgh Phygon-xl* . . . **a new improved fungicidal spray**

Pittsburgh Phygon-xl is a highly effective spray for the control of many of the fungous diseases of fruit trees, ornamental shrubs, and vegetables. It may be utilized, also, as a seed protectant.

It is easy to use, may be added directly to the water in the spray tank and is compatible with lead arsenate, DDT, Rotenone and Chlordane.

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* Registered trade name for 2, 3-dichloro-1, 4-naphthoquinone



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Scab (*Streptomyces scabies*) was of concern to several farmers in the Matanuska Valley because they washed their potatoes and sacked them in 10- to 15-pound bags for sale directly to merchants in Anchorage. The deep, scaly lesions detracted from the appearance of the potatoes handled in this manner and consequently potatoes with such blemishes had to be culled.

The other diseases of potatoes were about the same as those found in the Fairbanks area, except that a trace of witches broom (virus) was found in several fields in the vicinity of Palmer.

Grain Infected Too

SINCE many farmers have livestock in the Matanuska Valley, much more barley, oats, and wheat are grown in this Valley as compared to the amount produced in the vicinity of Fairbanks in the Tanana Valley. Consequently the smuts of oats, and covered smut of barley and wheat were found. Oat smut (*Ustilago spp.*) was found in all fields examined, but most farmers do not consider this serious because most of the oats are cut when green, shocked and allowed to dry in the shock, then it is brought in and used for hay. Field peas are usually sown with the oats when used for silage. The most smut was found in a 10-acre field of Trapmar barley where 26 percent of the heads were found infected with covered smut (*U. hordei*). In another field on this same farm, 10 percent of the heads of Chogot wheat were infected with bunt (*Tilletia sp.*). So far as the writer could find out, no farmer had been told about seed treatment.

Leafspots were found on many grasses and a few on legumes.

In the Anchorage area where seven farmers were growing about 110 acres of potatoes, ring rot was found on five of these farms during the Summer of 1948. In May of 1949, a trace of ring rot was found in stored potatoes on still another farm. This is also the first report of ring rot having been found in this area. Thus far ring rot has caused comparatively little loss in the Anchorage area as a whole because only a trace

of the disease was found on the farms of two of the larger producers.

Ring rot on potatoes in Alaska is a serious disease and it could become more severe if precautions are not soon taken to control it. In some respects it appears remarkable that farmers have done as well as they have because they have received comparatively little help from trained personnel in the control of plant diseases. All farmers interviewed were extremely cooperative and much in-

terested in learning to know crop diseases and how to combat them.

Blackleg was prevalent also in the Anchorage area. The most severe case was found in a one-acre increase plot where nearly 50 percent of the plants were infected.

In the Homer area, potatoes were observed on only three small farms. On two of the farms the plants were making excellent growth. However, on the third, the farmer did not be-

(Turn to Page 89)

Review of 1949 Insect Infestations in the United States



This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Dr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

Reports began coming in during January summarizing the status of some of the more important insect pests during the year just passed. A review of the situation should be of interest to readers of *Agricultural Chemicals*.

European Corn Borer

A SURVEY conducted late last fall by the Bureau of Entomology and Plant Quarantine in cooperation with agencies of 26 states showed that the European corn borer had spread into 145 additional counties in 1949. This serious corn pest is now known to occur in 1,312 counties in 29 States. In 14 of the Eastern States the borer was generally less abundant than in 1948. However, in all the Central States, except Kentucky, the insect was more abundant in 1949 than in 1948. The heaviest borer populations were found in a wide zone extending from west-central Ohio northwesterly to southeastern South Dakota. The borer populations in 1949 averaged about 3 times higher than in 1948 in the entire infested area, and 4 times higher in the Corn Belt States.

Estimates of damage caused by

the European corn borer in 1949 indicate that this insect destroyed some 313,819,000 bushels of field corn worth about \$349,635,000 on the basis of average prices received by farmers as of December 15, 1949. This loss greatly exceeds the estimated 85,485,000 bushels of corn destroyed by the borer in 1948.

Details regarding the status of the European corn borer in 1949 and estimates of the damage it caused to field corn in the various States are given in Insect Pest Survey Special Supplements (1950 Nos. 1 and 2), which were published by the Bureau of Entomology and Plant Quarantine on January 19 and February 3, 1950, respectively.

Japanese Beetles

INFORMATION compiled by workers at the Moorestown, New Jersey, laboratory of the Bureau indicates that the area over which the Japanese beetle is generally distributed showed an increase of about 3,960 square miles in 1949. The total area over which this insect is generally distributed is now estimated to be 47,910 square miles. The greatest spread was in Pennsylvania where

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... could work an incredible revolution. For it would make an almost unbelievable difference in its ability to fertilize some fruits and grains.

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additional infested territory was found in the upper Susquehanna River Basin and in the Pocono Mountains. In Virginia, dispersion of the insect to the southeast added an infestation along the Potomac River at Washington's Birthplace to the area of general infestation. Spread to the southwest added an infestation centering about Washington, Virginia. The abundance of the Japanese beetle during 1949 was discussed in this column in December 1949.

January Insect Conditions

THE bean leaf roller, potato leafhopper, serpentine leaf miner, and southern green stink bug were reported attacking beans in southern Florida during January. The southern green stink bug also caused severe damage to lima beans in southern Alabama early in the month.

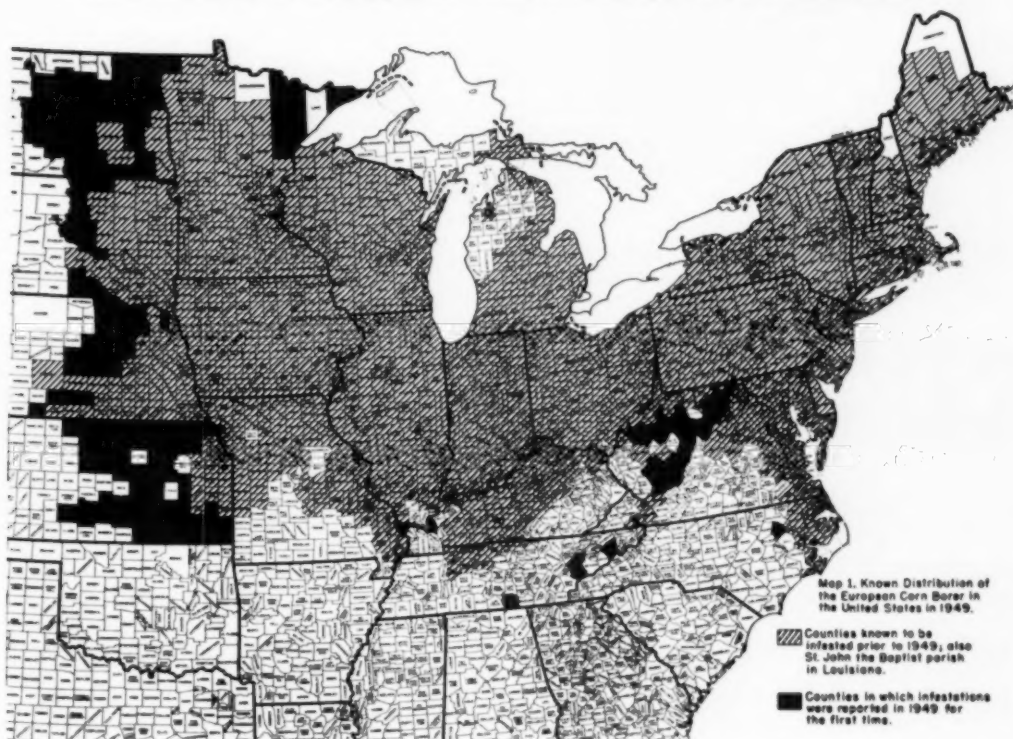
Moderate to heavy infestations

of aphids, chiefly the turnip aphid and the cabbage aphid persisted on crucifers in most parts of the South during January. The turnip aphid caused serious injury to turnips and other crucifers in South Carolina, Georgia, and Florida during the first half of the month. Populations of cabbage caterpillars remained generally light on crucifers, but the vegetable weevil and the banded cucumber beetle caused moderate to heavy injury to these crops in many parts of the South. Other insects reported infesting cole crops during the month included the southern green stink bug in parts of Florida and the seed corn maggot on young cabbage in South Carolina.

The southern armyworm was prevalent on tomato in Florida throughout January. The serpentine leaf miner was present in considerable number in Florida and appeared

to be on the increase as a pest of various vegetables such as tomato, squash, and cucumber. The onion thrips caused serious injury to onion seedlings in Georgia during the first half of the month, and later in the month this pest was present in threatening numbers on that crop in Texas. Severe infestations of the two-spotted spider mite were reported on strawberry from Virginia and Florida. Mole crickets caused some damage to tobacco plant beds in Florida, and aphid populations were increasing on eggplant, peppers, and strawberries in that State toward the end of the month. Other insects reported infesting vegetables in various parts of the South in light numbers during January included cutworms, the melonworm, green peach aphid, melon aphid, cucumber beetles, hornworms, tomato fruitworm, and flea beetles.★★

Distribution of European Corn Borer in U. S. During 1949





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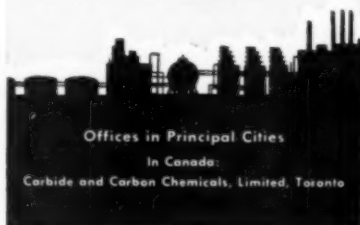
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AGRICULTURAL CHEMICALS

Technical Briefs

Fertilization by Air

Distribution of nitrogen fertilizers from airplanes has been practiced over a considerable area, particularly on the rice lands of California and Texas. It has been estimated that three times as much rice acreage was fertilized by airplane in 1949 as was seeded by this method. Fertilization by aerial methods has been used in both Indiana and Illinois, also. Any fertilizer material that can be drilled, can be distributed from an airplane.

An important consideration is that of fertilizer placement in soil. Over the past 25 years, much research work has been done to determine the best methods of fertilizer placement. In general, the placement of phosphatic fertilizers is highly important, while the placement of nitrogen is relatively unimportant, so long as it does not damage the seed or plants. In fertilizing small grains with phosphorus the best method is to place the fertilizer in the row with the seed. Broadcasting the material decreases the efficiency by about one-half. Airplane application is a broadcast treatment, thus we should not expect as good results from airplane placement of phosphorus as we get from the use of the best ground equipment. With nitrogen, the placement problem being relatively unimportant, we should expect about equally good results from airplane applications as from application by means of surface

equipment, providing the aerial application results in uniform distribution of the fertilizer. The big question, then, is one of relative economy.

Aerial application of fertilizers will be most practical: (1) Where the area to be fertilized is extensive, and (2) where the area is relatively inaccessible to ground equipment. In Kansas the area having the greatest need for fertilization is in the eastern part of the state where the fields tend to be small. In the large fields of central and western Kansas the need for fertilizers is much less than in the eastern part of the state.

—Excerpt from talk by Dr. H. E. Myers, Kansas State College, at Aerial Spray Conference, Manhattan, Kansas, Dec. 1, 1949.

Ky. Bluegrass Seed Yield

The effect of insecticide and fertilizer applications in increasing the yield of seed from Kentucky bluegrass is reported in bulletin 535 just issued by the Kentucky Agricultural Experiment Station, Lexington, Ky. Two plant bugs, *Amblytylus nasutus* and *Minis dolabratus*, are believed largely responsible for decreased seed yields in recent years. Both were found to be controlled by DDT, as a dust or liquid, and by chlordane. Insecticides should be applied about May 1, the Kentucky investigators recommend, because the nymphs are easier to kill than the adults.

Nitrogen was found to be the key fertilizer element in stimulating increased yields, and was much more effective when applied in the early spring rather than in the fall. Phosphorus and potassium were also somewhat effective in increasing yields. When both insect control and nitrogen fertilization were combined, the treatments were reported to be supplementary in their effects, the combined treatment producing an increase in yield in test plots of almost three hundred percent.

Grape Products DDT Free

Juices, jellies, jams and such products made from New York State grapes receiving the recommended vineyard sprays containing DDT were found to be free from DDT residues, according to check tests conducted at the New York State Agricultural Experiment Station, Geneva, N. Y. Although residues were found on the fresh fruit and in wastes from the processing operations, there was no residue in the processed juices, jams and jellies.

Weed Control in Flax

Approximately 720,000 acres of flax in the Northwest Flax Belt were sprayed with 2,4-D last summer. This represents 15.9% of the total Flax acreage grown in the six state area and shows a substantial increase over past year. Total use of 2,4-D for all crops in 1949 nearly doubled over the previous year in North and South Dakota and Minnesota, but appears to have levelled off in Iowa and Wisconsin. (See table below)

SURVEY OF THE USE OF 2,4-D IN SIX FLAX GROWING STATES

Acres Sprayed, 2,4-D	No. Dakota	So. Dakota	Minnesota	Iowa	Montana	Wisconsin*
Small grain sprayed	2,595,420	2,789,000	2,137,409	400,000	1,590,000	147,640
Flax sprayed	312,996	122,000	254,650	25,000	5,000	360
Corn sprayed	16,010	200,000	146,691	1,000,000	5,000	12,000
Other sprayed	152,230	19,000	143,626	75,000	—	20,000
Total acres sprayed	2,990,476	3,000,000	2,682,376	1,500,000	1,600,000	180,000
Private ground sprayers	8,831	—	—	24,500	—	1,800
Custom ground sprayers	502	—	—	700	—	400
Total ground sprayers	9,333	7,100	16,798	25,200	—	2,200
Total airplane sprayers	172	138	—	55	20	4
Total ground dusters	386	12	—	0	150	0

*Represents returns from only 70% of counties in Wisconsin



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Black Leaf 10 Dust Base—a "free" nicotine compound, easy to mix with non-alkaline carriers to make a neutral dust.

Black Leaf Garden Dust—a multi-purpose dust or spray containing nicotine, pyrethrum and rotenone—plus a concentrated fungicide.

Black Leaf Rotenone Dust—1% rotenone and sulphur, blended on our special carrier material.

Black Leaf Mash-Nic—for controlling the large roundworm (*Ascaridia galli*) in chickens. A "single-shot" treatment.

Nico-Fume Liquid—contains 40% actual nicotine in a "free" form—for greenhouse spraying and fumigating to control aphids and similar sucking insects.

Nico-Fume Pressure-Fumigator—spreads penetrating nicotine fumes under pressure to control aphids and similar sucking insects in the greenhouse.

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INDUSTRY NEWS

Camson to Plant Products



EDWIN J. CAMSON

Plant Products Corporation, Blue Point, L. I., New York, has announced the appointment of Edwin J. Camson as sales manager and director of research. Mr. Camson was for 15 years connected with Orbis Products Corp., New York, where he was in charge of insecticide sales. The new sales manager is a graduate of Columbia University, where he received a degree in chemical engineering in 1932. He plans to make his home on Long Island, near Blue Point.

Corn Borer Hq. to Iowa

The European corn borer research headquarters of the U. S. Department of Agriculture will be transferred from Toledo, Ohio to the Ankeny, Iowa, Field Station of Iowa State College, it has been announced by Dr. P. N. Annand, chief of the Bureau of Entomology and Plant Quarantine. Dr. Annand said the transfer of personnel and equipment will be complete by March 31. Other Bureau entomologists engaged in the study of various phases of borer control in corn at Lafayette, Ind., and Muscatine, Iowa, also are being transferred to the new Ankeny headquarters, Dr. Annand said.

The Bureau will not close out all research work on the corn borer at the Toledo station, however. Studies

on the resistance of corn plants to borer attack in progress there for many years, will be continued. Borer control research in Iowa will be fully cooperative between the Federal Bureau of Entomology and Plant Quarantine, and the State Agricultural Experiment Station. Activities will be under the direction of W. G. Bradley for the Bureau, and Dr. H. M. Harris for Iowa, as in the past.

Dr. T. A. Brindley, previously in charge of the Bureau's pea weevil investigations at Moscow, Idaho, is being transferred to Iowa by the Bureau to assist in the general direction of the program. He will be employed jointly by the Bureau and State Experiment Station to coordinate activities primarily applying to all aspects of the European corn borer problem in Iowa.

Becomes Research Head



DR. L. K. HERNDON

Dr. L. Kermit Herndon, Professor of Chemical Engineering at Ohio State University, has been appointed Director of Research for Mathieson Chemical Corporation. In charge of research, pilot plant, and market development work, Dr. Herndon's headquarters will be at the company laboratories in Niagara Falls, New York, with an office in the Mathieson Building in Baltimore.

Consulting engineer to the company prior to his present appointment, Dr. Herndon will continue to hold his university post while completing graduate research assignments and supervising Mathieson's Ohio State University Research Foundation project.

Ark. Plant Dedicated

The farmer-owned fertilizer plant in N. Little Rock, Arkansas, was formally dedicated on February 6, in a ceremony featuring a talk by Dr. R. P. Bartholomew, director of the Arkansas Agricultural Experiment Station. Although the plant had been in full operation since December 21, dedication exercises marked the official opening of the factory. Capacity of the plant is listed as 800 tons of mixed fertilizer daily. It is a fully-mechanized unit, eliminating hand labor in the manufacturing of fertilizer almost entirely.

MEETINGS

North Central Branch, A.A.E.E., President Hotel, Kansas City, Mo., March 23 & 24.

10th Annual Southern Shade Tree Conference, Wilmington, North Carolina, March 23-25.

California Weed Control Conference, Pomona, Calif., April 4-6.

National Agricultural Chemicals Ass'n., Haddon Hall Hotel, Atlantic City, April 20 & 21.

Western Shade Tree Conference, Long Beach, Calif., May 24-27.

National Fertilizer Association Greenbrier Hotel, White Sulphur Springs, W. Va., June 12-14.

Pacific Slope Branch, A.A.E.E., Hotel Casa del Rey, Santa Cruz, Calif., June 14, 15 & 16, 1950.

American Plant Food Council, The Homestead, Hot Springs, Va., June 29-30, July 1 & 2.

National Shade Tree Conference, Syracuse, N. Y., Aug. 21-25.

California Fertilizer Association, Coronado Hotel, San Diego, Calif., November 2-4.

North Central Weed Control Conference, Milwaukee, Wis., Dec. 12-14.

American Association of Economic Entomologists, Denver, Colorado, Dec 18-21.

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S. D. Firms Consolidate

Consolidation of two firms in Sioux Falls, S. D. has been announced. Firms involved are the Sioux Falls Milling Co., and Batcheller's. The



PAUL BATCHELLER

newly-formed unit will manufacture feed and act as distributors for herbicides, insecticides, sprayers, and fertilizers. Officers of the new corporation, known as Batcheller's Inc., are: Paul Batcheller, president and general manager; Charles B. Newcomb, vice-president and assistant general manager; and Dr. W. E. Poley, secretary and nutritionist. The latter is also in charge of sales and educational work.

April Calif. Weed Meeting

April 4 and 6 are dates designated for the second annual California Weed Conference to be held at Pomona. Although at press time the program had not been arranged in detail, plans had been made for the over-all scope of the conference. According to Walter S. Ball, chief of the California Bureau of rodent and weed control and president of the C.W.C., the first day of the meeting will feature representatives of experiment stations, the extension service and the State Department of Agriculture. These speakers are expected to discuss the economic phase of weed control and the part played by each of these agencies.

Specific subjects to be covered the first day are expected to be weed control research; brush control; and

weed control on non-cultivated areas such as highways, industrial areas and railway rights of way.

Demonstrations of application equipment are to feature the second day's program. Aircraft of both fixed-wing and rotor variety as well as ground equipment will take part in the demonstration. An open forum on weed control research will occupy the evening period.

Aquatic weed control will be the chief subject for discussion on the final day of the meeting, with emphasis on control of unwanted plants in irrigation streams, public water supply and lake and reservoir weed problems. The subject of weed control in row and field crops is expected to be covered by Dr. W. A. Harvey, University of California. Weed control on citrus is also on the agenda.

Joint Committee Reports

A book containing the proceedings of the 25th annual meeting of the National Joint Committee on Fertilizer Application has been issued. The volume presents reports by the secretary and reports of subcommittees and cooperators.

Organizations represented in the Joint committee include The American Society of Agricultural Engineers; the American Society of Agronomy; The American Society for Horticultural Science; the Farm Equipment Institute; the National Cannery Association; and the National Fertilizer Association. Officers are C. H. Mahoney, Washington, D. C., General Chairman; A. L. Lang, Urbana, Ill., vice-chairman; and M. H. McVickar, Washington, D. C., Secretary-Treasurer.

NFA Plans Big Meeting for June 12-14

THE National Fertilizer Association has announced that one of the most important conventions in its history will be held at the Greenbrier, White Sulphur Springs, West Virginia, June 12-14. According to an announcement by Russell Coleman, president of the Association, the program and other activities of the meeting will be built around the general theme of the industry's centennial year: "A Century of Progress with Fertilizers."

In addition to distinguished speakers from the ranks of agriculture, business and government, the NFA has planned other special features appropriate to the occasion. Members and contributors have shown interest in the group's invitation to display exhibits illustrating the progress which has been made during the industry's century of achievement. Other features of the centennial meeting will be published in later issues of *Agricultural Chemicals*.

The names and subjects of those who have already accepted the Association's invitation to address the convention include: Allan B. Kline, president, American Farm Bureau Federation, "A Century of Progress on the Farm;" Robert M. Salter,

chief, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, "A Century of Progress in Fertilizer Research;" and Ralph Robey, chief economist, National Association of Manufacturers, "A Century of Progress in our Country's Economy."

The Plant Food Research Committee of the Association will present a panel on "A Century of Progress in Compounding and Utilizing Fertilizers," with the following among those who will participate: H. B. Siems, director of research, Plant Food Division, Swift & Company; S. D. Gray, northeast manager, American Potash Institute; H. H. Tucker, president, Coke Oven Ammonia Research Bureau; K. D. Jacob, head, Division of Fertilizer and Agricultural Lime, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture; and Vincent Sauchelli, director Agricultural Research, Davison Chemical Corporation.

Annual addresses will be delivered by Ray King, chairman of the Board of Directors of NFA, and by Dr. Russell Coleman, president. The centennial banquet, followed by a program of entertainment will be held on Tuesday, June 13.

CFA in S. F. Meeting

The Cliff Hotel, San Francisco, was the site of the Northern California meeting of the California Fertilizer Association on January 27. CFA president J. M. Quinn, California Sun Fertilizer Co., Los Angeles, presided. In his address before the group, he asked fertilizer manufacturers to cooperate, and to be "alert, active and virile." "The future of our free enterprise system, the future of our own business, calls for our collective will to combat the encroachments of those political agencies that would undermine and destroy us," he said.

Elmer S. Nelson, CFA executive secretary, Los Angeles, presented his report which included matters of budget, membership, and other Association matters. Forty-one industry members were in attendance at the meeting.

Plans Opening in April

Minnesota Farm Bureau Service Company's new fertilizer plant under construction at Moorhead, Minn., is expected to be completed in April. The new factory will have an annual capacity of 18,000 tons per year, it is reported. Dimensions of the plant are 62 by 230 feet, and at its highest point, it is six stories tall. The storage portion of the building is 200 ft. long, with the remainder of the structure devoted to the modern processing and materials handling equipment. Adjacent to the plant is a single-story office building, 35 by 45 feet in size. Executive personnel of the plant will be D. A. Williams, general manager and Adolph Norem, operating superintendent. Engineers and architects for the construction are Toltz, King and Day, Inc., St. Paul, Minn.

MSC Names Horticulturist

H. L. R. Chapman has been appointed horticultural extension specialist at Michigan State College, East Lansing. In this position he will conduct programs with amateur and home garden groups throughout the state. Mr. Chapman has been director of Beal Botanic Gardens at MSC for the past 13 years, and has been closely

associated with gardens and plants all his life.

Jenkins to Sprout, Waldron

Sprout, Waldron & Co., Inc., Muncy, Pennsylvania, have an-



S. V. JENKINS

nounced the appointment of S. V. Jenkins as sales representative in New York State. The company manufactures a complete line of mixers, attrition mills, conveyors, crushers, dust collectors and rotary feeders.

The new representative was formerly connected with E. I. du Pont de Nemours & Co., Inc. and has been active in the American Institute of Chemical Engineers in New York State. He will make his headquarters in Muncy, Pa. for the present time.

Calif. Fert. Salesmen Meet

An organization of fertilizer representatives is being formed in the state of California in order to "obtain and disseminate useful knowledge and information pertaining to the scientific development of agriculture" through proper use of fertilizers. The tentative name of the group is the "Institute of Plant Food Salesmen."

Park Dunford, Inland Fertilizer Co., Los Angeles, temporary chairman of the new group, reports that the initial meeting of the group was held January 18, at which time the objectives of the organization were laid out. At a second meeting, January 21, the group stated that such a plan "might possibly come within the framework of the CFA and have such

support as may be deemed advisable until the organization of fertilizer salesmen is in a position to assume its own financial responsibilities." The group then requested Elmer S. Nelson, executive secretary of the CFA to present the matter to the forthcoming meeting of the CFA Board of Directors, which was done.

Going on record as favoring the establishment of the fertilizer salesmen's group, Wallace Macfarlane presented a supporting motion which was unanimously adopted by the CFA Board of Directors. Mr. Macfarlane's motion stated: "We highly approve with commendation, the formation of an organization of salesmen . . . and hereby delegate the advisory committee of the California Fertilizer Association to work with the members and extend to them such assistance and cooperation as will assure the success of the plan."

Two New Fertilizer Plants

Two new fertilizer plants are to be erected in St. Francis county, Arkansas, near Forrest City, it has been announced. The plants will manufacture anhydrous ammonia, for use on the Arkansas delta, according to Forrest Riffe and C. V. Steed, co-owners of the R & S Liquid Fertilizer Co., which is building the plants.

Western Shade Tree Conf.

The western chapter of the National Shade Tree Conference will hold its seventeenth annual conference at Long Beach, California, May 24-27, 1950, it has been announced by Victor G. Anderson, vice-president, Stockton, California. Other officers of the western chapter include C. Elmer Lee, Los Angeles, Calif., president, and Aaron L. Olmsted, Los Angeles, secretary-treasurer.

ALCOA Appoints Kambach

Aluminum Company of America, Pittsburgh, has appointed M. Russell Kambach as advertising manager, effective March 1. Mr. Kambach, who has been assistant advertising manager for the past year, will be succeeded by Jay M. Sharp, of the company's advertising dept.

AGRICULTURAL CHEMICALS

Big RFC Loan for Plant

The Reconstruction Finance Corporation on February 6 approved a \$3,349,000 loan to Mississippi Chemical Corp. which is building a multi-million dollar fertilizer plant on a 500-acre site near Yazoo City, Miss. The corporation is owned by some 9,000 farmers who live principally in Mississippi, Alabama and Louisiana, with a few surrounding states.

Owen Cooper, executive vice-president of the corporation, states that production in the new plant is expected to begin about January 1, 1951. Output is expected to be about 120 tons of anhydrous ammonia daily. From this, about 50 tons will be converted into some 140 tons of ammonium nitrate. Mr. Cooper indicated that with the RFC loan, construction work, launched several months ago, will be stepped up. The raising of an additional \$500,000, necessary to bring the total capital stock to \$4,750,000, was not expected to be difficult, according to Mr. Cooper.

Rebuild Texarkana Plant

Reconstruction of the building destroyed by fire on February 23 at the Texarkana, Arkansas, fertilizer plant of International Minerals & Chemical Corporation will be undertaken immediately, according to an announcement by Maurice H. Lockwood, vice president in charge of the plant food division. Total damage caused by the fire is still undetermined. The fire consumed the main building, while the smaller nearby structures were saved, including the warehouse and office, the ammonia storage tanks, and the superphosphate plant. The new structure will incorporate the latest improvements which the company has devised for the modernization of its fertilizer plants.

Pulva Names New Officer

Ferdinand Kolisek has been named secretary and treasurer of the recently-formed Pulva Corporation, Perth Amboy, N. J., according to an announcement by the company. Mr. Kolisek was formerly with Pulveriz-

ing Machinery Co. for some 13 years. The new corporation in Perth Amboy will market a complete line of impact type pulverizers under the trade name of "Pulva-Sizers," according to F. Elmer Oswald, Sales and Advertising Manager of the firm.

Jury Advanced by A&S



R. E. JURY

Arkell & Smiths, paper bag manufacturers, Canajoharie, N. Y., have announced that R. E. Jury has been made Western Sales Manager, supervising the Kansas City, Minneapolis and Chicago territories. The appointment was effective at the first of the year. Mr. Jury, who has been with the firm since 1947, was formerly Division Manager in the west.

USDA Studies Systemics

Wider application of systemic insecticides which make host plants toxic to insect pests is being sought by the Agricultural Research Administration of the U.S.D.A. Studies are under way to determine if these insecticidal chemicals will break down into harmless compounds within a few days or weeks. If they do, a new approach will be available to agriculture in the control of some of the most difficult insect pests, according to entomologists of the B.E.P.Q.

Chemicals most suitable for this purpose in tests, so far, are derived from the inert calcium phosphate rock. This abundant source of the basic insecticidal chemicals is treated to obtain pyrophosphoric

acid, or oxidized to obtain phosphoric pentoxide. A wide variety of insecticidal chemicals can be derived from these sources.

The number of compounds that can be obtained from the calcium phosphate source is many, the chemists of the Department say. Relatively few of them are known, and only a fair start has been made in testing those that are available.

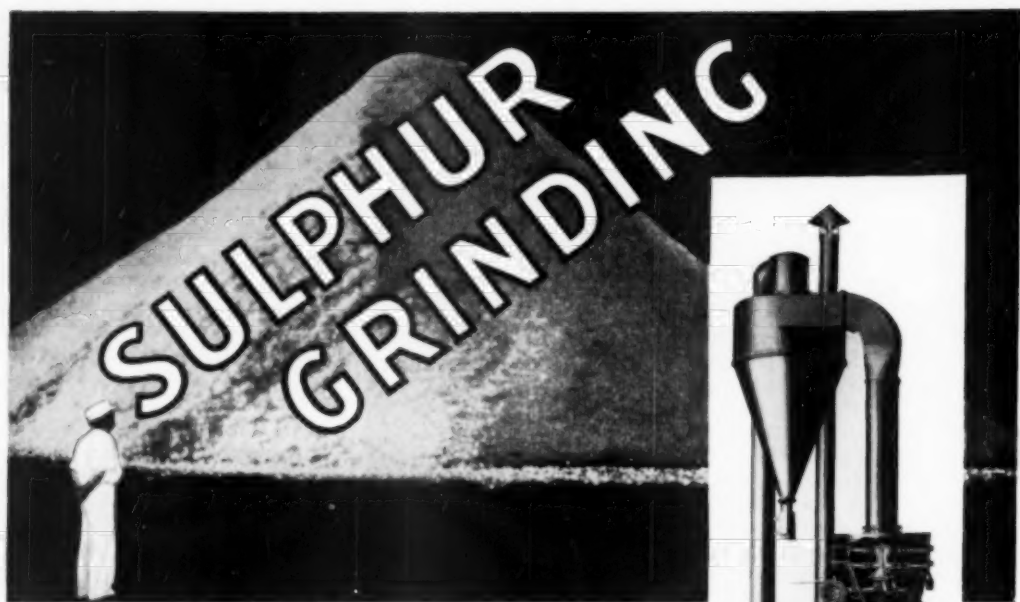
The chemists emphasize the importance of the fact that these materials appear to break down into harmless substances. Some of the materials appear to be highly selective in the insects they will kill. One kills aphids and mites and apparently none of the other insects on the plants. Studies are needed to determine their effect on beneficial insects such as bees, parasites, and predators.

One of the chemicals applied to the soil will kill European corn borers, in the stalks. Another kills aphids and mites on cotton when tiny amounts of the chemical are applied to the cotton seed prior to planting. Another kills greenbugs when applied as a spray to growing wheat. In the greenhouse, resistant mites are killed with applications of aerosols containing one of the systemic insecticides.

The entomological discovery of these new materials has renewed interest in the idea of controlling insects by injecting or applying insecticides that will be taken into the plant tissues so that insects feeding on them will be killed. Bureau entomologists have studied the problem for many years. But none of the chemicals studied until recently have warranted further investigation.

Purdue Pest Meeting

A two-day conference on the control of insects and rodents was scheduled to be held at Purdue University, Lafayette, Ind., March 13 and 14, according to Dr. J. J. Davis, head of the Department of Entomology at Purdue. The emphasis will be on public health. A repeat meeting was to be held March 15 and 16 at Indiana University, Bloomington, for the benefit of public health sanitarians of southern Indiana. Dr. Davis stated.



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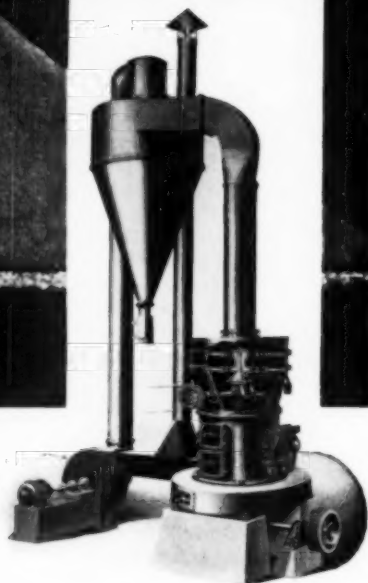
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RAYMOND HIGH SIDE ROLLER MILL equipped with Whizzer Separator, providing wide range fineness control by one simple adjustment.

Ala. Plant Opens Soon

Production of pesticidal materials was expected to begin about April 1 in the new plant of Tobacco By-Products & Chemical Corp. now nearing completion at Montgomery, Alabama. Selection of this site was made to expedite deliveries of insecticides to the cotton, peanut, vegetable and fruit-growing regions of the South, the company states. The new plant is being erected on the property of the parent company, Virginia-Carolina Chemical Corp., adjacent to the present V-C fertilizer plant. Sales to distributors and dealers of cotton poisons and other insecticides will be handled jointly by the Tobacco By-Products and Chemical Corp. and V-C sales offices throughout the South.

The company has been producing insecticides since 1885, and has long been the world's leading producer of nicotine sulphate. Other plants are located in Richmond, Va. and Louisville, Ky. The new Montgomery plant is the first to be established for the manufacture of a general line of pesticides "in an effort to serve better the crop protection needs of southern agriculture."

Hercules Moves Fassig

Hercules Powder Co., Wilmington, Delaware, has announced the assignment of an entomologist to the Midwest to give added technical service on toxaphene insecticides. Walter W. Fassig, who has been working with county, state, and federal agricultural authorities in the Midwest, on the application of toxaphene insecticides, was transferred from the Wilmington office to Hercules Powder Company's Chicago office, on March 1.

Mr. Fassig's experience with toxaphene insecticides includes their use against cotton insects, livestock pests, grasshoppers, and other insect pests which annually attack midwestern crops. He is a graduate of Ohio State University, where he studied applied entomology and did graduate work in economic and applied entomology. Later he worked at the University of Delaware on a Her-

cules fellowship for four years and held the faculty position of assistant entomologist.

Represents Three Firms



J. H. HOEFFLER

J. H. Hoeffler, above, has become manufacturer's representative for American Cyanamid Co. "Cyanogas" products; Nott Manufacturing Co., Mt. Vernon, N. Y.; and the B. G. Pratt Co., Hackensack, N. J.

Dietzel to Dow Territory

A. L. Dietzel will represent The Dow Chemical Company's agricultural chemical department in Missouri, Oklahoma, Kansas, Colorado, and New Mexico, it has been announced by D. K. Ballman, general sales manager.

Mr. Dietzel was born in San Antonio, Texas, and educated at St. Mary's Academy and Texas Christian University. While attending TCU, Mr. Dietzel received athletic awards in the three major sports, football, basketball, and baseball. In basketball, he was chosen All-American center in 1932.

In May of 1941 Mr. Dietzel was employed as a salesman in the St. Louis branch office of The Dow Chemical Company and in June of 1944 was transferred to Dow's Houston office. In September of 1947 he entered the employ of the McCarthy Chemical Company and became sales manager covering the chemical and petroleum field until February 10, 1950, at which time he resigned to become associated with the agricultural chemical department of Dow.

Calif. Short Course Held

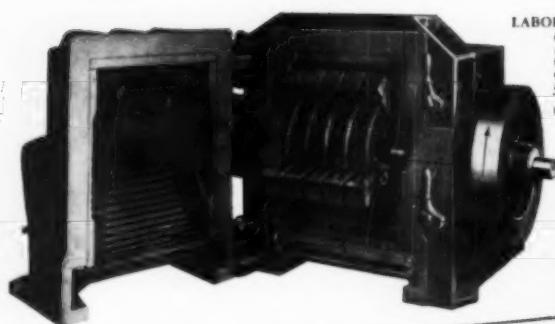
A short course for Agricultural Pest Control Operators was held at Davis, California February 1-3, under the sponsorship of the University of California College of Agriculture and the California State Department of Agriculture.

The program included discussions of citrus pest control, soil fumigation, pest control in deciduous orchards, pest control laws, weed and rodent control, truck and field crop pest control, and the use of aircraft in agriculture.

Speakers on the program included Knowles A. Ryerson, assistant dean of the College of Agriculture; Leo J. Klotz, professor of Plant Pathology, Riverside Agricultural Experiment Station; Ralph Newcomb, Di-Giorgio Farms, Marysville, Calif.; Al Flebut, Western Manager, Niagara Chemical Div., Food Machinery and Chemical Corp., Richmond, Calif.; Allen B. Lemmon, Chief, Bureau of Chemistry, Calif. State Dept. of Chemistry, Sacramento; Walter S. Ball, Chief, Bureau of Rodent and Weed Control, State Department of Agriculture, Sacramento; R. N. Rayner, Dow Chemical Co., Pittsburg, Calif.; E. A. Michelbacher, Assistant Prof. of Entomology, U. of Calif., Berkeley; and Roy Hansberry, Director, Shell Oil Co. Agricultural Laboratory, Modesto, Calif.

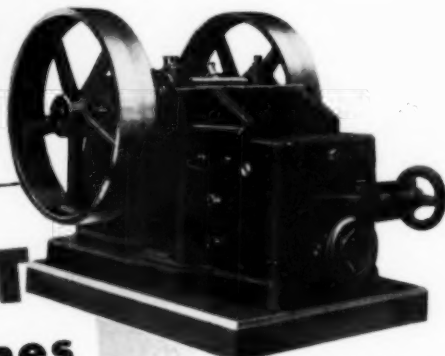
An Apology to Mr. Bromfield

In an editorial in our January issue we mistakenly charged Mr. Louis Bromfield, author of a new volume soon to be published and entitled "Out of the Earth," with antipathy for commercial fertilizers. As Mr. Bromfield points out in his letter to us, he has long been "an advocate publicly and in practice of the use of chemical fertilizers as indispensable to good agriculture." We should have known this, if for no other reason, through his talk at the 1949 meeting of the National Fertilizer Association in which he commented "it is impossible for this country to do without chemical fertilizer." We express our apologies to Mr. Bromfield for our comments which resulted from being misinformed as to his views.



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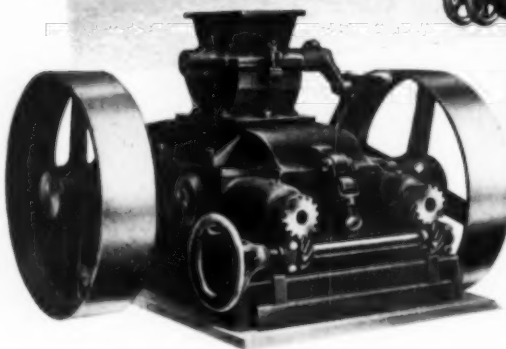


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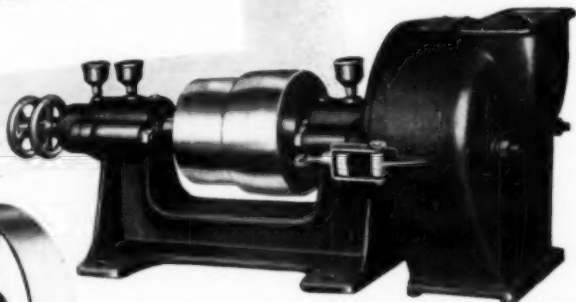
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New England Fertilizer Conf. Reviews Progress

EMPHASIZING that the American fertilizer industry is an important part of the heavy chemical industry, Dr. Russell Coleman, president of the National Fertilizer Association, told the New England Fertilizer Conference at New Haven, Conn. that members of the industry should work toward letting the public know that the term "fertilizer" no longer refers merely to the by-product of farm animals. In his talk at the meeting, on February 27, he reviewed the century-long history of the industry, pointing out in particular, the great strides taken by manufacturers in increasing production over the years.

The New England Conference, held in cooperation with NFA, was a part of the 75th anniversary of the Connecticut Agricultural Experiment Station which was established in New Haven in 1875, making it the oldest station in the U.S. Dr. Coleman appeared as speaker at a banquet at the Taft Hotel. He declared that the fertilizer industry has enabled the U. S. to outrace the Malthusian theory and has given the world new hope for food to keep pace with population increases.

In recalling significant events in connection with the development of the fertilizer industry, Dr. Coleman said the real beginning dates back to 1824, when two barrels of Peruvian guano were received in the U. S. for fertilizer purposes. Six years later, importations of nitrate from Chile began, and in 1840, Leibig experimented in treating animal bones with sulfuric acid. In another five years, the value of potassium as a plant food was demonstrated. All of these events lead up to the manufacture of mixed fertilizers in 1850.

Since then, the NFA head stated, the years have continued to show progress. In 1856, he said, the first state fertilizer control law was passed in Massachusetts; in '72, test plots were begun in Pennsylvania; 1875 saw America's first Agricultural Experiment Station launched in Connecticut; and Florida phosphate rock

was discovered in 1881. "But in the 20th century, the industry put on long pants," Dr. Coleman continued. In 1915, potash was found in California; and the first synthetic nitrogen was made in 1921. Ten years later, the first shipment of potash from New Mexico was sent on its way. This accomplishment, he said, made the U. S. independent of foreign nations for a potash supply.

Development of the fertilizer industry has brought about a greater yield per acre, and sufficient production to feed not only ourselves, but much of the remainder of the world. It has helped to reduce the number of persons needed to raise food, he said, pointing out that in 1850, 60% of all American labor was employed on farms, compared to less than 12% today. The industry has kept pace with general industrial development he said, and has made a great contribution toward a high standard of living.

The replacement of plant foods removed from the soil by harvested crops brings a national stability often lacking in the past. "History records the collapse of many ancient civilizations because of soil fertility loss and consequently the lack of food," he recalled. However, in 1950 there remains much to be accomplished, with only a third of the spent plant nutrients being replaced in the soil each year. Thus, there is broad opportunity ahead for the fertilizer business. More concentrated plant food is needed, and the industry needs to work with the state Experiment Stations to teach farmers better practice, he suggested.

Dr. James G. Horsfall, director of the Connecticut Station, presented a review of "Seventy-Five Years of Agricultural Research"; pointing out the tremendous strides taken in this direction during the past three-quarters of a century. T. E. Odland, Rhode Island Agricultural Experiment Station talked on the functions of the major and secondary plant-food elements. Dr. Odland described the uses of potassium, calcium,

magnesium, boron, manganese, iron, sulphur and copper in plant growth, emphasizing the necessity of keeping the various elements in proper ratio for desired results.

Vincent Sauchelli, Davison Chemical Corp., Baltimore, pointed out some of the many complicated factors involved in determining the need for and the application of minor elements on crops. He said that there are now 12 elements known to be essential in plant growth, but the amounts of some of these must be controlled rigidly. In the case of alfalfa, for instance, these plants will tolerate large amounts of boron, but if such over-borated plants are fed to animals it may prove fatal to them.

Dr. Sauchelli expressed the hope that eventually the micro-nutrients will be included in fertilizer mixtures according to research findings. However, there are problems in the chemical reactions involved, he reminded, and the guarantees which should accompany such mixtures would add to the manufacturer's detail. However, the grower must know how much of certain elements are contained in a given fertilizer, and also how available it may be to the crop.

Dr. Firman E. Bear, Rutgers University, New Brunswick, N. J., gave the fertilizer industry credit for making it possible to feed the 2½ billion people now populating the earth. Use of fertilizer materials is the only method of doing this, he asserted. In his talk, "Alleged Toxic Effects of Inorganic Fertilizers," he ribbed the advocates of "organics only," citing the experiment station at Rothamstead, England, where inorganic fertilizers have been applied to the same plot for 106 years, and crop yields have remained constantly good for many decades. "If it is earthworms you want," he said in referring to one of the main points of contention by the "organic" advocates, "then fertilize and grow crops." Abundant crops contribute organic matter to the soil, he said, and pointed out one experiment wherein two tons of organic matter was gained from every ton of commercial fertilizer applied over a period of 15 years. "Those who ob-

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130



ject to fertilizer are those who don't have much use for it," Dr. Bear observed. Most objectors are city gardeners who demand "nature's own fertilizer" for crops. However, the elements found in commercial fertilizers are as "natural" as anything can be. "They came from the earth, and the farmer is just putting them back," he said.

The second day's program, February 28, consisted of five papers in the morning, and a tour of the station in the afternoon. Three speakers representing the Conn. Sta. appeared. H. J. Fisher discussed the history of fertilizer inspection in the state; C. L. W. Swanson presented a technical paper on "Soil Structure and Crop Production"; and H. A. Lunt spoke on "Soil Testing and its Significance to Northeastern Agriculture." C. V. Kightlinger, Massachusetts Agricultural Experiment Station, Amherst, related some of the problems of tobacco growing. A series of Kodachrome slides picturing Japanese agriculture, was presented by J. S. Owens, University of Connecticut to complete the speaking portion of the meeting.

Appointed Mine Agents

Millmaster Chemical Corporation, New York, has been appointed exclusive agent for the sale of "Wollastonite," a Calcium Metasilicate, and "Diopside," a Calcium Magnesium Metasilicate, it has been announced by the Willsboro Mining Company, Inc., Willsboro, N. Y. New uses for the products are being developed for both "Diopside" and "Wollastonite" in insecticides, vegetable oil purifications, detergents, etc.

Sawyer Joins Stanford

Dr. Frederick G. Sawyer, editorial representative of the eleven western states for the American Chemical Society, has joined the staff of Stanford, California, Research Institute. His primary assignment will be the administration of the Institute's Air and Water Pollution Research program, according to an announcement by Dr. J. E. Hobson, director. He will also consult on special problems in chemistry and chemical engineering research.

AGRICULTURAL CHEMICALS

Oak Disease Studied

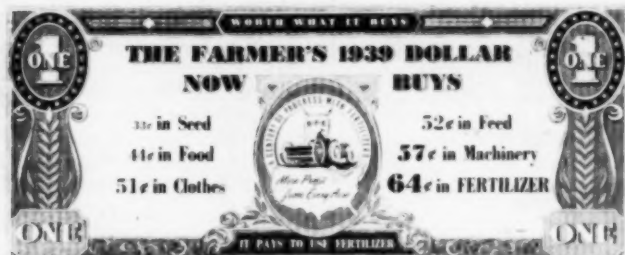
How to halt a new wilt disease of oak trees is under study by forest pathologists of the U. S. Department of Agriculture who state that the disease (*Chalara quercina*) has attacked trees in seven midwestern states, and that it is a threat to all oak trees.

The fungus causing the disease was described and named as lately as 1944. A relative of the beetle-carried fungus that causes Dutch elm disease, it develops more rapidly on red and black oaks than on white oaks. Red oaks show it first in the upper crown. The leaves become a dull light green, curl upward, and then before falling may turn yellow to reddish brown. All leaves may fall within a month from the first ap-

pearance of symptoms. Trees may be dead within a year. Sucker growth often appears on trunk or branches of wilt-infected trees, but it soon succumbs to the fungus. On red and black oaks the wilt kills the stump and roots, and so the usual regeneration method of the oaks (by stump sprouting) is out. The fungus spores may survive two years in stumps.

Most oaks in the eastern part of the U. S. are susceptible to the wilt. It has been found in 11 oak species in nature, and in 17 other oak species inoculated experimentally. It spreads through wound infections and can go from tree to tree through natural root grafts. However this latter method does not explain the appearance of the disease in new localities some distance from where the disease had been previously.

Fertilizer Publicity Program Dramatizes Savings

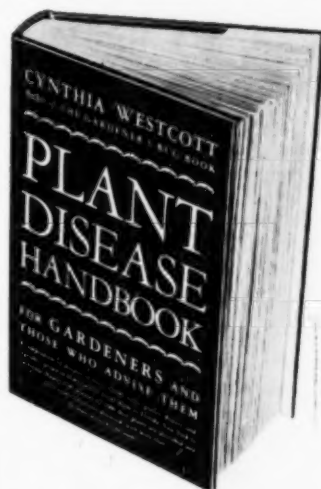


Above: One of a set of new posters and a "farmer's 1939 dollar bill" prepared by the National Fertilizer Association for distribution by fertilizer manufacturers and dealers to dramatize the fact that fertilizer prices have in-

creased but little in comparison with the prices of other commodities which the farmer purchases. These sales aids and industry good will builders are offered at nominal cost thru the N.F.A., 616 Continental Bldg., Washington, D. C.

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Fertilizer Bags

The National Cotton Council of America, Memphis, Tennessee, has written *Agricultural Chemicals* to correct the impression created in our January editorial on the use of cotton bags by the fertilizer industry. Enclosing posters, which the Council points out were distributed voluntarily by many fertilizer companies, the letter stated that no undue pressure was exerted to promote the use of cotton

bags against competitive products. "In fact," the letter says, "we discussed the matter of increasing the use of cotton bags for packaging fertilizer with officials of each of the largest fertilizer manufacturers before engaging in the program, and most of the ideas incorporated were those suggested by manufacturers. Most of the large manufacturers, and hundreds of the smaller fertilizer producers, voluntarily assumed the dis-

tribution of the posters to their sales outlets."

"The principal reason for the decline in use of cotton bags for fertilizer which began during the war when cotton supplies were difficult

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to obtain, is the price differential between cotton bags and competitors. It is the purpose of the cotton industry's campaign to show that the cotton container is more economical, despite the price differential because of its high re-use value. Fertilizer manufacturers, without the effect of any 'commercial blackjack,' know that the Cotton States consume more fertilizer than do all other sections of the country combined. They realize further that this consumption will decline in ratio with the decline of cotton's markets. It is logical, therefore, for the fertilizer manufacturer to welcome a campaign designed to retain an important market for his most important group of customers."

The letter was signed by Ed Lipscomb of the National Cotton Council. The posters mentioned in the correspondence were to be displayed by fertilizer dealers and manufacturers calling to the attention of the farmer that "We sell Fertilizer packed in 'More for your Money' Cotton Bags." (See cut above.)

Pkg. Meeting in April

The 19th annual packaging exposition of the American Management Association is scheduled to be held April 24-27 at the Navy Pier, Chicago, Ill.

AGRICULTURAL CHEMICALS

Western Weed Conference at Denver

A THREE-DAY meeting featuring speakers representing the U. S. Department of Agriculture, marked the 12th annual assembly of the Western Weed Control Conference in Denver, Colorado, January 30 to February 1. The group elected W. W. Robbins, University of California, president; C. I. Seely, University of Idaho, vice-president; and Walter S. Ball, California State Department of Agriculture, secretary-treasurer.

The first day of the conference took on the aspect of a national program in that the day was turned over to agencies of the Federal Government. Dr. K. S. Quisenberry, in charge of the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, Washington, D. C., presented a report on the present activities and future plans for weed control in his Bureau. At the conclusion of his paper, he introduced Dr. R. L. Lovvorn, head of the new weed division of the B.P.I.

Chairman of the forenoon session was R. L. Balcom, Bureau of Reclamation, U. S. Department of the Interior, Washington, D. C. Five departments of the government were represented and a total of thirteen speakers took part in the panel. This discussion was of particular interest to officials of the eleven western states, since about seven-eighths of the Federal lands administered by the five government departments are located in the eleven western states. A total of 408,000,420 acres of land are owned or controlled by the Federal government in this area. With these lands either already infested, or capable of being infested, they naturally hold an important place in the weed control programs of the states represented at the Western Weed Conference.

The second day of the conference was devoted to demonstrations and exhibits of both equipment and herbicidal materials in the Denver City auditorium. Some 32 exhibitors took part in displaying some of the

latest developments in weed control equipment as well as many of the newer materials used in control of weeds. Talks were presented on the use of aircraft in weed control, the application of agricultural chemicals and control of brush and aquatic weeds.

Wednesday afternoon's session was in charge of the Research Committee, under the chairmanship of

Dr. Lowell Rasmussen, Washington State College, Pullman. At this session, W. A. Harvey, extension weed specialist, U. of California, discussed the chemistry of weed control; C. I. Seely, University of Idaho, D. C. Tingey, Utah Ag. Experiment Station and F. L. Timmons, U.S.D.A., talked on "Perennial Weed Control"; and the "Control of Annual Weeds in Crops by the use of Selective Herbicides" was presented by R. L. Warden, Montana State College; Virgil Freed, Oregon State College,

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AGRICULTURAL CHEMICALS

Lambert C. Erickson, University of Idaho, and W. W. Robbins, U. of California.

T. F. Yost, State Weed Supervisor, Topeka, Kansas, discussed state organization, and Dr. Robbins talked on the educational phase of weed control. In this connection, Dr. Robbins reported that he had sent a questionnaire to all of the more important schools throughout the country requesting information on what courses are being offered in weed control. Concluding the Wednesday afternoon session, Walter S. Ball, California State Department of Agriculture, Sacramento, discussed the regulatory phase of weed control.

Committee reports rounded out the conference, with announcement that the group will hold conferences once every two years instead of annually. The reason for this action was that most of the western states now have active state weed meetings, and that an annual meeting of the entire group would be repetitious. The 1952 meeting will be held in Reno, Nevada.

Ag. Chem. Sales Aids

A new sales promotion folder, "Dealer Sales Aids for 1950" has been prepared for the convenience of distributors of agricultural chemical products of Dow Chemical Co., Midland, Mich. Current sales literature is included in the case as well as reproductions of Dow advertising of agricultural chemical products. Illustrations of electros, mats, decals, etc., available for dealer use are included.

Canadian Report Out

Progress in the use of agricultural chemicals is indicated in the recent annual report of the Canadian Minister of Agriculture for the year ended March 31, 1949. Studies of fertilizer on different soil types were undertaken during the year, the report states, as were experiments with minor elements. James G. Gardiner, Minister of Agriculture, reports work done in all phases of agriculture, including soil testing and the use of fertilizers; insect control; plant disease control and seed treatment and in-

spection. The book is a 260-page work, priced at 50 cents by the Canadian Department of Agriculture, Ottawa, Ont.

New NFA Movie Under Way

The National Fertilizer Association has announced that it will produce a new motion picture pointing out the changes which have taken place in agricultural practice during the past several decades; especially as these changes relate to the use of fertilizer. Copies of the tentative script have been submitted to members of the Plant Food Research Committee, sponsors of the picture, and it is expected soon to work the film into its final form.

Schreiber Joins MGK

Dr. Albert A. Schreiber has joined the staff of McLaughlin Gormley King Co., Minneapolis, Minn., where he will do research and development work on insecticides and other products for the firm.

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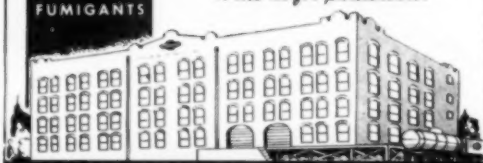
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AGRICULTURAL CHEMICALS

NFA Publishes Centennial Book

A NEW book, "A Century of Progress with Fertilizers" has been published by the National Fertilizer Association, Washington, D. C. Well illustrated and featuring articles by prominent persons in the field, the book will be distributed within the trade at a below-cost figure.

Contributing authors include Dr. R. M. Salter, Chief of the U.S.D.A. Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville, Md.; Herman W. Steinkraus, President of the U. S. Chamber of Commerce; Louis Bromfield, author and agriculturist, Lucas, Ohio; Gordon R. Clapp, Chairman Tennessee Valley Authority; Allan B. Kline, President, American Farm Bureau Federation; Albert S. Goss, Master of the National Grange; A. J. McFadden, President National Council of Farmer Cooperatives; Dr. Firman E. Bear, Chairman, Soils Department, New Jersey Agricultural Experiment Station, New Brunswick, N. J.; Dr. Emil Truog, Chairman, Department of Soils, University of Wisconsin College of Agriculture; Dr. W. E. Colwell, Head, Department of Agronomy, North Carolina State College; and W. T. McGeorge, Head, Department of Agricultural Chemistry and Soils, Arizona Agricultural Experiment Station. A preface was written by Ray King, Valdosta, Ga., chairman of the NFA Board of Directors, and a letter from President Harry S. Truman is reproduced.

In his article, "Fertilizers Yesterday, Today and Tomorrow," Dr. Salter reviews the progress of agricultural science over the years, points out the increases in yields, and states that higher yields present greater nutrient demands. "Soil becomes more and more the medium through which water and nutrients are made available to plants, and less the sole or main source of these materials," he says. "In view of this situation, the expectation is justified that over the long pull, the use of fertilizers will climb to successively higher levels."

Mr. Steinkraus points out the importance of the fertilizer industry,

not so much from its volume of sales, but from the fact that "without a modern fertilizer industry, the pattern of agricultural production in the United States would have been far different from what it is. Soil depletion in the older farming sections would have limited production far below present levels. Costs of production would be higher and these in turn would have been reflected in higher costs of food," he says.

Mr. Bromfield stresses good soil management in his article, "A Farmer Looks at Fertilizer," and deplores the misuse of land which has allowed thousands of farms to deteriorate into deep gullies. However, these can be restored, he maintains. "Commercial fertilizer with perhaps some trace elements together with lime will produce upon millions of acres of so-called 'worn-out' land a frequently prodigious growth of healing grass and legumes which, after growing there and being turned in during a succession of years, will wholly reclaim these areas and put them back into circulation as highly profitable row-crop land."

In his article, "The Fertilizer Industry and Conservation," Mr. Clapp of T.V.A. states that although there are many who look upon the pace of erosion as too swift to overtake, good management and the proper use of fertilizer can rebuild worn-out farms. He says that "For the fertilizer industry, this trend toward efficient land management can have far-reaching, and, on the whole, beneficial effects. The traditional concept of fertilizer—as a quick stimulant for a bigger crop—is changing; farm people are beginning to see that fertilizer can become a bulwark of lasting soil fertility. . . . This should mean a greatly expanded market, perhaps as much as three to four times the present market for certain materials."

"The Meaning of Fertilizers to the American Farm Bureau Federation" is discussed by Mr. Kline who points out that "fertilizers from now on need to be more than a stimulant

to crops . . . fertilizers need to carry more and more of the whole load of feeding a crop. This has been true for years in the thin soils of the nation, but is too rapidly becoming the status in the heavier soils of the Middle West." He declares that sound soil management requires the use of fertilizers; that soils cannot be mined safely for long periods and still serve man well. "This makes the use of adequate fertilizers by farmers a vital matter to all Americans every year, whether the times are good or tough." He concluded the article by saying that the farmer must be able to purchase adequate amounts of fertilizer every year to fit into the pattern of stable values. A farmer "can't milk his cows one day and omit the next, nor fertilize his soil only in the boom years," he states.

Mr. Goss commends the fertilizer industry in his article, stating that had it not been for the fertilizer industry, the soil in vast regions would have become useless and abandoned and this trend would still be continuing, leading to desolation. "Instead," he says, "We now face the prospect of greater yields, greater prosperity and a rising standard of living."

Mr. McFadden stated that today no good farmer would think of allowing a year to pass without the regular application of commercial fertilizer. "The complete standardization of their product (fertilizer) makes the farmer certain that he is getting full value for his outlay and that the results he expects from a given application will be forthcoming," he points out.

Dr. Bear, in discussing "Fertilizer Use Yesterday, Today and Tomorrow in the East," looks into the future to see the primary problem for intensive cropping as being "that of developing farming programs that reduce the percentage of the time the soil is under cultivation, provide more crop residues for return to the land, produce even higher yields when the land is being farmed, and maintain the fertility of the soil by the aid of a liberal and well-balanced fertilizer program."

Greater use of fertilizers in the midwest is seen by Dr. Truog in his article. "Since the midwest produces 60 percent of the nation's food, one might argue that it should eventually account for 60 percent of the fertilizer consumption. That would be at least 10 million tons annually," he states. Factors which would tend to increase fertilizer use include the cost of labor, the fact that erosion-resisting cover crops are quickly pro-

duced on fertile soil, and that the water-holding properties of the soil are greater when vegetation is heavier. "Evidence indicates that crops grown with adequate fertilization are often less subject to injury by insects, diseases and unfavorable weather conditions," he concludes.

The use of fertilizer from a southern viewpoint is described by Mr. Colwell. He points out that although crop yields per acre are lower

and the per capita income in the southern states is lower than that of the north as a whole, "it is also true that wherever fertilization has been practiced in the south, production has increased and per capita income has risen."

Mr. McGeorge states that the eleven western states, while comprising some 40 percent of the land area of the country, consumed less than 6 percent of the total U. S. fertilizer tonnage in 1948. The consumption figure is increasing, however, he states, but points out that there are many problems, both economic and physical, in the placement of both dry and liquid fertilizers.★★

Texas Plant for Dow

Dow Chemical Company, Midland, Mich., has announced that construction has started on a new \$5,000,000 ammonia plant at Freeport, Texas. The plant is expected to be completed and in production by late 1950. The new plant will make available refrigeration grade and technical grade anhydrous ammonia in tank-car quantities as well as quantities of aqua ammonia to industrial and agricultural consumers in the South and the Mississippi Valley.

Anhydrous ammonia is a major source of nitrogen for use in fertilizers and has been used for direct fertilization in considerable quantity on the West Coast and in the Delta region of Arkansas, Louisiana, and Mississippi. The company states that there are indications that this use will spread to the corn-growing regions of the Middle West and the cotton, rice, and vegetable sections of the south.

AEPCO Meeting Report

The second annual report of the Association of Economic Poisons Control Officials has been published by the group, covering the meeting held in October, at the Shoreham Hotel, Washington, D. C. The book contains the full text of talks made at the meeting, the proposed state custom application bill, committee reports, and names of officers of the organization.

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N. Central AAEE to K.C.

The North Central Branch of the American Association of Economic Entomologists will hold its annual meeting at the President Hotel, Kansas City, Mo., March 23 and 24.

The subjects of insecticides, residues and equipment will occupy the first morning, with George List as chairman. Discussion leaders will include Ray Hutson, T. C. Allen, C. J. Weinman and Kenneth Messenger. The afternoon session is slated to hear a discussion on insects affecting man and animals. Ephraim Hixson is chairman, with discussion leaders including D. E. Howell, E. F. Knipling, R. J. Dicke and W. N. Bruce.

Also on the agenda for the afternoon session is a discussion on truck crop insects, with T. E. Bronson, chairman. Appearing on this portion of the program are R. A. Blanchard, A. A. Granovsky, R. I. Post, R. K. Chapman, and J. M. Wright.

Discussions are to continue on the morning of the second day, with Dr. List as chairman. Leaders of the discussions will include Dr. George W. Decker, Roger C. Smith and John Rowe.

The afternoon of March 24 is to be divided into two sessions; the first on fruit and greenhouse insects, and the other on cereal and forage crop insects.

To Open New Potash Mine

Duval Sulphur & Potash Co., is the new name for the former Duval Texas Sulphur Co., Houston, Texas, it has been announced by the company. The new name became effective on February 14.

The firm has completed financial arrangements and is now beginning a construction program to open a new potash mine in New Mexico.

ANSWERS FTC

(Continued from Page 43)

will increase at the expense of lower grades. As our techniques improve and as new, higher materials of eco-

nomie and mix-feasibility are developed, the trend will be toward raising grades still further.

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now on to follow state recommendations both on grade and rate of application."

High Analysis Uneconomical?

THE thesis that the possible economy in use of "high analysis" mixed fertilizers varies with the locality, and that in some areas, or beyond certain concentrations, high analysis products can be extremely uneconomical, is repeated by a Virginia manufacturer who says:

"Up to a point it is economical to use high analysis fertilizers. Beyond that point it sometimes becomes uneconomical. This varies depending upon crops, soils and areas. Where transportation costs are high, the higher analysis grades are naturally more economical. Education is sometimes slow, but it is the best way to bring about improvements rather than compulsion. The industry, land grant colleges and other agencies have carried on a campaign of education for many years. They have made progress, although education is not fast enough at times to suit many of our extremists who would like to force their opinions and judgment on others.

"In some areas of low transportation costs fertilizer carrying 20 to 25 units of plant food is the most economical grade and it carries secondary plant foods of value. It is not the most economical in other areas.

"Great progress has been made and more can be made through the medium of education. Generally speaking, the American farmer is not wasting a lot of money today buying low grade fertilizer. Industry selfishly and properly wants to see the farmer use the grade and kind of fertilizer most economical and beneficial to him, because industry can prosper only if the farmer prospers."

Analysis Trend Upward

FIGURES are cited by another participant in our symposium to support the position that there has been a substantial increase in plant food content of mixed fertilizers over recent years. He cites the figures of Dr. A. L. Mehring of the U.S.D.A. in the following comments:

(N-P₂O₅-K₂O) in fertilizers in

1920 was 13.90%—the average analysis being 2.3% N, 9.2% P₂O₅ and 2.4% K₂O, while in 1949 the total plant-food content was 22.0% or 4.1% N, 10.6% P₂O₅ and 7.3% K₂O. From this it is evident that during this period there has been a slight increase in the percent of P₂O₅, almost a 100% increase in nitrogen and a 300% increase in K₂O. These increases might have been even greater except for the fact that many farmers were not familiar with the advantages of high analysis fertilizers. Many of them did not have the machinery for applying the more concentrated mixtures in such a way as to avoid injury to young seedlings. In other words the use of high analysis fertilizers is dependent both upon an educational program and the development of machinery for the application of the more concentrated mixtures. In some cases, a shortage of materials has likewise retarded the manufacture of high analysis mixtures.

"As to potash, I do not think any one can raise a question as to the success of the potash industry in producing and delivering high analysis mixtures. For example, since 1937 when American potash producers began to take the lead in the production of potash for consumption in this country, the 60% grade of muriate of potash (which runs about 98% KCl) has increased from 59% to 81% of the total agricultural deliveries. The 50% grade of muriate of potash (most of which is now a special granular form for direct application) has decreased from 24% to 8%, and manure salts, the lowest potash grade in chloride form now offered for sale has decreased from 8% to 4%. The amount of sulphate produced has decreased from 9% to 7%. In other words, most of the potash delivered in this country for agricultural purposes is in the form of almost pure salts."

Association Publications

BOTH associations in the fertilizer field have published booklets and other material from time to time which refute some of the charges in the F.T.C. report. The National Fertilizer Association, for instance,

published a pamphlet about two years ago entitled "What's in a Bag of Fertilizer?" of which hundreds of thousands of copies were distributed. The pamphlet explained in simple language why it is impossible to make a one hundred per cent nitrogen-phosphorus-potassium compound.

The NFA has also recently published a booklet entitled "A Century of Progress With Fertilizers" (See Pg. 83) in which business, agricultural and government leaders review the substantial achievements of the fertilizer industry. In many of the articles are statements which serve to refute the charges in the F.T.C. report.

A booklet prepared by the American Plant Food Council some time ago and entitled "Facts About Proposed Fertilizer Legislation," makes the point that in formulating mixed fertilizers "filler cannot be completely eliminated because small quantities of materials are needed as conditioning agents. Some is needed to make analyses come out to even grades and weights since fractional analyses are not permitted by control laws." However, it is emphasized that the practices of farmers in buying from their own cooperatives are strikingly similar to their practices in buying from the private fertilizer industry. During the 1942-43 fertilizer year, for instance, studies made by the Farm Credit Administration show that 72.1% of the fertilizer distributed by farm co-ops was in the form of mixed fertilizer, while the percentage of mixed fertilizer distributed by the commercial industry was 75.4%.

(To be Continued)

LIVESTOCK PESTS

(Continued from Page 35)

Two new materials, the pyrethroids, and polypropylene glycol butoxide give some promise as horsefly repellents and are under study at several stations.

Recent work at Cornell by C. Logothetis and H. Tashiro shows that horsefly larvae are abundantly present in the moist parts of many pastures and meadows. The emerging flies rest on the vegetation of a few

hours before flying and feeding. Dusting of these breeding areas might kill large numbers of flies and reduce the numbers of some forage pests but the cost of frequent applications, and the residue hazards make this procedure unpromising at present.

Solution of the horsefly problem apparently will have to await the advent of an insecticide as fast in action as pyrethrum, and with the residual effectiveness of DDT, or a very durable, low cost repellent.

Sheep Attacked Also

NORTHEASTERN sheep suffer from the attacks of sheep ticks, lice, wool maggots, and nose bots. Several years' tests at Cornell indicate that rotenone is still the best material for tick (Ked) control. Half a pound of 5% material makes 100 gallons of dip which will treat 50 to 100 sheep, depending on length of wool. DDT in suspension at a dosage of .25 per cent gives equal control at slightly greater cost. Dips containing phenothoxin, fixed nicotine, yam

bean, thanite, or pyrethrum in combination with wettable sulphur also control ticks, but none are as cheap or convenient to use as rotenone dip. Reports from various sources indicate that benzene hexachloride and chlorinated camphene also are excellent materials for use against sheep ticks. They also control sheep lice.

Wool maggots are occasional pests in the northeast and are much dreaded by sheep men. Maggots can strike a flock and be causing deaths within a week. Maggot "strike" usually is brought on by wounds or by bloody droppings that soil the wool and attract the adult flies. Several species of blow flies are involved and apparently all are not susceptible to the same materials. A few years ago a serious infestation in a flock of 1500 animals was taken care of by one dipping in a .5% DDT suspension. The species causing this outbreak was *Lucilia caesar*, and the flies apparently were attracted by some unusual odor in the wool which developed when three days of heavy

rain were followed by a period of unseasonably hot weather.

Cornell veterinarians report that nearly all the sheep examined in the College's post mortem room are infested with maggots of the nose bot fly. The damage they cause is not well understood and no effective control measures are known.

Hog Lice Control

HOG lice and mange cut deeply into the profits of many northeastern growers each year. Remarkable results against these pests have been obtained by power spraying with benzene hexachloride at dosages as low as 4 and 6 pounds of 6% gamma material per 100 gallons. At the four pound dosage no odor nor off-flavor was detected in the meat or lard from an animal slaughtered 3 weeks after treatment. While lice and their eggs are killed by these low dosages, and mange is greatly retarded, it is believed that stronger concentrations will be required for complete eradication of mange in a herd.★★



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TESTIMONY

(Continued from Page 45)

that there is still a place for the older arsenical insecticides, where the newer ones cause biological upset or other complications. A wide selection of insecticides is desirable, he said, to fit a wide range of specific needs, and every economic poison useful for the purpose intended should be available. This includes all new products as soon as they can be accepted for registration.

The necessity for providing the grower with a wide and diverse choice of insecticides was emphasized by Dr. Cox. Giving as an example conditions in the state of California, he said that insecticides which present no residue problem are known to be relatively ineffective against pests on certain vegetable crops unless used very frequently, or unless they are preceded by a material of high potency, such as DDT. Particle size, timing, and other spray or dust factors may differ for various regions and crops. One host may tolerate one insecticide, and others may withstand another. Expensive insecticides cannot be used on low income crops. Because of the cost factor and also because of the wide difference of effectiveness in different regions, "there should be no other policy than to provide the grower with a wide and diverse choice of economic poisons to fit the needs for control of the particular pest."

Minor Crops Important

FREQUENTLY overlooked, but none-the-less important to both growers and consumers, are a number of relatively minor crops which had not been mentioned at the hearings heretofore, Dr. Cox stated. "California," he reminded, "grows more than 90 percent of the 230 different kinds of crops considered to be commercial in the nation, including practically all kinds of pome fruits, citrus fruits, nuts and vegetables." He then presented a table describing the crops, their pests, and the most effective insecticide to be used for pest control.

REBOUNDS

(Continued from Page 55)

complained our informant, a representative of the fertilizer industry. Said your operative in reply, "Neither can the government, but unfortunately no one in Washington seems to realize it."

* * *

While on the subject of TVA, we might pass along the following item culled from the February 7th issue of the "New York Times." Apparently TVA had been castigated by a disgruntled reader in the correspondence columns for engaging in "more than thirty business activities which are in direct competition with individual enterprise." W. L. Sturdevant, Director of Information of TVA, unlimbered his typewriter to reply, pointing out that TVA's only "manufacturing plants are the fertilizer works at Muscle Shoals, which are used in research and experimental production to develop and improve products and processes: the beneficiaries are the private business of agriculture and the private fertilizer and allied chemical industries." We can admit Mr. Sturdevant is in the clear in classifying fertilizer users as "beneficiaries" of the TVA, particularly the 75 in each county that get free fertilizer for "test use," but please Mr. Sturdevant, let's not kid the public by listing the fertilizer industry as a co-beneficiary. We have a sneaking feeling that they would rather not be benefitted just this way. And if the government is not competing with thirty private industries, but only with one, how does that justify the competition with that one,— which in this case happens to be the fertilizer industry?

PLANT DISEASES

(Continued from Page 61)

lieve in the use of commercial fertilizer so the plants were generally unthrifty. Moreover, blackleg and witches broom were common in this one-acre plot.

The Homer area can produce excellent vegetables and a few fine gardens were observed. The only serious injury to plants was that caused by aphids to strawberries. The leaves on most plants were purplish-red and associated with this color were numerous aphids on the undersides of the infested leaves.

The most striking disease in

the Homer area was found on a cattle ranch where the farmer was cutting blue joint grass. The healthy plants were about seven feet high, while about 10 percent of the plants were considerably dwarfed by stripe smut (*Ustilago striiformis*).

From this brief account of diseases of crop plants in Alaska, it can be seen that many of the plants grown in the Territory have apparently many of the same diseases that occur on the same kind of plant in the U. S. This indicates an increasing need for disease control chemicals in the territory.

HERBICIDES

(Continued from Page 41)

resistant to normal dosages of 2,4-D.

A number of formulations consisting of mixtures of 2,4-D and 2,4,5-T are now on the market as brush killers. This effect of 2,4,5-T on species not affected by 2,4-D, shows the differences in toxicity which can be brought about by only slight changes in molecular structure.

Because 2,4-D is so compatible with plants and produces responses ranging from stimulation at low concentration, to death at high concentration, it seems probable that new channels of investigation will be opened not only in the field of weed control but also in the fundamental behavior of physiologically active compounds in living plant cells.

Oils

BECAUSE petroleum presents such a vast array of chemical compounds for testing, work on oils has proved interesting and profitable. Oils such as diesel fuel and smudge pot oil have long been used as general contact herbicides; they have proved particularly effective on grasses, and their physical properties are such that even a poor spraying job may produce good results because of their creeping down into crowns. Lighter oils such as stove oil, kerosene distillate, and Stoddard solvent have proved selective in the control of weeds in crops of the carrot family. Many possibilities still



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lie ahead for the use of oils in pest control.

Studies have proved that oil toxicity is determined principally by unsaturates. Olefinic and aromatic compounds are highly toxic to plant cells and in proper concentration will kill most plants. At lower concentrations, the lighter unsaturates (boiling above around 400° F) kill weeds selectively in carrot crops. This selectivity is not due to differential wetting but to a tolerance of the toxic compounds by the crop plants. This tolerance extends to other members of the carrot family, namely celery, parsnip, parsley, fennel, dill, and a number of wild species. A marked oil tolerance is also displayed by certain weeds, namely wild carrot, wild parsnip, water hemlock, fennel, pineapple weed, dog fennel, yellow star thistle, and others. Selectivity between crops and weeds is relative; members of the carrot family are highly tolerant but some differences occur among them; flax, onions, lettuce, and even beets

and other vegetable crops are somewhat tolerant. On the other hand, grasses are highly susceptible.

All oils are highly compatible with the plant cuticle; they wet and spread readily and, if heavy enough to persist without vaporizing, they soak in and penetrate. Probably most of the effects of oils on cells are the result of interaction with the living protoplasm. It has been popularly stated that oils kill by smothering plants. Actually, plant cells have been known to stay alive with the protoplasm actively streaming many days when mounted in paraffin oil. If smothering by oil were possible these cells should have died.

TREE CONFERENCE

(Continued from Page 51)

the plant, he said. Where then, he asked, do the organics pass over into pure chemicals? Nitrogen in clover, he also pointed out, is derived from air, where it is found in as a pure a state as can be obtained. Water,

too, he added, is not an organic material.

"The case for raw phosphate is even more sillier," he went on. "But, if you treat it with acid to produce a super phosphate, they say it is 'vile.' The trouble is that facts never stop these organic folks. They just evade them."

"The biggest bogey man of all," he declared, "is their claim that chemicals affect health. The American Medical Association has stated that it does not recognize any claim that chemical fertilizers cause cancer, arthritis or bad teeth. We ought to use more common sense. This is the 20th century, not the age of witchcraft and to say that chemicals make us sick is about as silly as to say that our declining birth rate is due to increased use of refrigerators."

Asking "Is there a case for use of chemicals on trees?" Mr. Carleton pointed out that it is essential to get plant food into a tree early in its limited annual period of growth. "Trees can't eat beefsteak," he said.

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"and they don't care whether they get their nitrogen from a bag or from the soil. But, before they can get any benefit from organic fertilizer, the proteins in it have to be broken down. That takes time and that's why, when I want fast growth, in the natural growing cycle, I'll take chemicals."

Dr. L. C. Chadwick of Ohio State University, Columbus, O., who "moderated" the debate, brought up some practical considerations. Organic nitrogen, he conceded, is important and many benefits result from its use. Supplies are available in many localities, but he pointed out that there is a question of cost involved. Citing current market prices of nitrogen both on a per pound and per ton basis, he showed that inorganic fertilizer has a price advantage over the organic type. "Are we justified," he asked, "in paying from four to eight times as much for the organic as for the inorganic product?"

Examining utilization of the two chemicals he showed that if utilization of nitrate nitrogen is put at 100, utilization of organic nitrogen is 70. On availability, the inorganic also scored over organic, he said, and he dismissed such matters as leaching and effect on soil acidity as of little consequence. He conceded that inorganic nitrogen can harm plants, but said he could also cite examples where organic nitrogen has killed trees. If there is such a thing as an "ideal" fertilizer, he closed, it might advantageously contain perhaps 10 percent nitrogen from organic sources.

Richard K. Allman, city arborist, Cedar Rapids, Ia., was elected president of Midwest chapter for 1950. Alfred F. Carlson, superintendent of plantations, Chicago Park District was moved from secretary-treasurer to fill the vice presidential post vacated by Mr. Allman, and retiring president, Noel B. Wysong, chief forester, Cook County Forest Preserves, Chicago, was given the secretary-treasurer job. Chicago will be the 1951 meeting place of the mid-west group, it was decided, and an effort will be made to get the National Shade Tree Conference convention for Chicago in 1951.

Registration at the LaSalle,

although numbering nearly 350, was thought to have been reduced somewhat by a severe ice storm in the area which kept many potential convention attendants at home looking after damaged trees.

POTASH INDUSTRY

(Continued from Page 32)

Basin began to look for potash deposits. The Snowden-McSweeney Company discovered at a depth of about 1,000 feet near Carlsbad, New Mexico, potash deposits of thickness and volume equal to the best of the European deposits. The United States Potash Company was immediately organized and in 1931 became the first American company producing potash from this source. A few years later the Potash Company of America located in the same area came into production and was followed during the war by the International Minerals and Chemical Corporation. These three companies and the American Potash and Chemical Corporation at Searles Lake, are the major factors in the present American potash industry, although Bonneville, Ltd., in Utah and Dow Chemical Corporation in Michigan are producing substantial amounts.

In 1935 The American Potash and Chemical Corporation, the Potash Company of America, and the United States Potash Company, together with the potash importers, organized the American Potash Institute to promote the educational and research activities on the agricultural use of potash.

With the advent of World War II the nation was in a position far more secure with respect to potash supplies than it was during World War I when our short supply was almost disastrous. In 1938, the last normal pre-war year, a little less than 500,000 tons of K_2O were delivered in North America for both agricultural and chemical purposes, approximately one-half of which were from imports. Since then, to meet the demands for both agriculture and industry, American producers with private capital have increased production each year. American production now is

in the neighborhood of a million and a quarter tons.

Imports decreased each year, entirely vanishing during the latter years of the war. Small tonnages are again coming to the United States, about 20,000 tons K_2O in 1948, but foreign countries are reluctant to ship to this country in spite of their desire for dollar exchange because the price of K_2O here is less than on any of the other world markets.

Thus, with known deposits sufficient to last hundreds of years, we have an All-American industry capable of supplying this country in either peace or war with its entire needs for this vital mineral.

GRANULAR PLANT

(Continued from Page 37)

other factor lies in the mechanical difficulty of applying high analysis fertilizer with existing machinery. It is often necessary to put on the ground only half the amount formerly used and some of the machines are ill-adapted for such an adjustment.

However, progress is being made through an educational program, and because of an increasing number of young farmers who have been taught in agricultural colleges the advantages of better fertilizer materials. "These fellows haven't developed a prejudice, and are not set in their ways of thinking," Mr. Sorensen observes. "Thus, they can be reached through farm meetings and by company representatives."

The Iowa Plant Food Company takes justifiable pride in its granular products. "With the machinery we have, we can turn out as much as 15 tons per hour, with a crew of five men," Mr. Sorensen reports. He adds that eventually, the number of men may be reduced even more as plant efficiency and teamwork increase. The demand for the granular material is expected to increase, since the product has so many advantages over the powdered form. From the farmers' angle, it is pointed out, fertilizer may be stored in bags without fear of its hardening and becoming difficult to apply, and the granular material may also be dis-

tributed in a uniform manner with proper placement. From the manufacturer's standpoint, it solves many conditioning problems difficult to handle heretofore.

No Hand Work

THE flow of material through the plant is accomplished with no hand shoveling nor handling. The raw materials are handled by Hough Payloaders which dump the necessary materials into an elevator hole, starting them on their way through the weighers, mixers, granulators, driers and eventually to the bagging machines. A complete system of overhead conveyor belts is arranged so that the material may reach quickly any portion of the 400-ft. long building.

Gus Mautner, plant superintendent, is responsible for keeping the plant operating smoothly. Although the process is largely automatic, he still keeps an eagle eye on operations. He is enthusiastic over the building's design which enables him to walk down the center driveway and see

all that goes on. Material may be loaded or unloaded from trucks or railway cars on each side of the building, he points out, and automatic feeders direct the material to the correct bin, in the case of unloading cars.

Tracing the flow of material from bin to bag, the dry ingredients of the formula first travel to the batch mixers; from there via feeder belt to the weighing belt. The mix is then sent to the "pug" mill where nitrogen solution is added, as is the amount of water necessary to complete the granulating process. After being treated in the Sturtevant granulator, the material is sent to the drier below the granulator. Later, completely dried, the granules are passed over a 4-mesh screen which catches any over-sized pieces which return to the feeder. The others then pass over a 20-mesh screen which strains out the too-fine particles which are picked up by dust collectors and re-circulated in the system. The usable granules then go to the cooler and eventually to storage bins.

Mr. Mautner expresses delight in making the new plant work. He is eloquent in his praise of the general layout which of course refers to the hydraulic valves, conveyor belts, automatic weighers, dust collectors and elevators put in by Sturtevant. "We have only eleven men on the day shift, including maintenance and car unloaders," he points out. During November and December, before the plant was operating at full capacity, a crew of "green" men was able to produce some 6,000 tons of material, the superintendent reports. Such a record would be difficult to duplicate without modern material-handling equipment.

The Iowa Plant Food Company, operating from Des Moines, distributes its fertilizer products over the entire state. Being located in the approximate center of the state, distances to any portion of the area are not prohibitive. Approximately eight months were required to build the factory, ground having been broken in April, 1949.

ENTOMA

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Industry Patents

2,490,966. VALVE BAG. Patent issued December 13, to John Johnson, Saffle, Sweden, assignor to Billeruds Aktiebolag, Saffle, Sweden. In a valve bag of the character described having its valve formed by folding in a corner of the bag, a tube of relatively pliable and bendable material attached in said valve and protecting a short distance therefrom, said tube forming with the bottom of said valve a blind valve, and a tongue of relatively stiff material resistant to bending and approximately in the form of a segment of a circle, said tongue being attached adjacent the top side of said valve and adjacent the outer end thereof whereby said tongue may be folded downwardly into said blind valve and the projecting outer end of said tube may be doubled and thus sealed by folding in of said tongue into said blind valve after the bag has been filled through said tube.

2,495,208. FOG-PRODUCING SPRAY NOZZLE. Patent issued January 24, 1950, to Herbert W. Causser, Weymouth, Mass., assignor to Farcoy Mutual Research Corp., Boston, Mass. For producing fog, a device comprising a first conical baffle having openings therethrough distributed around its circumference at the larger end thereof, a second conical baffle disposed within said first conical baffle with a space between the two baffles, the larger end of the second baffle having a flaring surface directed toward said openings and at angle to the outer surface of the first baffle, means for directing a sheet of water along the outer surface of said first baffle from the smaller end to the larger end and means for admitting water into said space, whereby water flowing into the space is directed outwardly by said flaring surface through said openings in the first baffle to form jets which intersect said sheet at the outer surface of the first baffle, thereby to break up the sheet into fog.

2,495,375. SPRAYING APPARATUS. Patent issued January 24, 1950, to Alan Lishman, Pickering, Ont., Canada, assignor of one-half to Ernest L. Ruddy, Pickering, Ont. Spraying apparatus comprising a standard having a base part by which it is vertically supported, a sleeve mounted on said standard for rotation about the vertical axis thereof, a spray gun pivoted on the upper end of said sleeve on a horizontal axis to rotate in a vertical plane, a flexible tubing extending from said spray gun for connection to a source of spraying liquid, a hand lever pivoted on the lower end of said sleeve on a horizontal axis for vertical movement, the pivotal axis of said hand lever being arranged at substantially right angles to that of said spray gun, and a tie rod pivotally connected to said spray gun and to said hand lever, the pivotal connections of said tie rod permitting universal movement thereof, and said tie rod being so propor-

tioned in length relative to the distance between the pivot points of the spray gun and the hand lever on the standard plus the sum of the distances between these pivot points and the pivot points of the tie rod on the spray gun and the hand lever as to enable the hand lever to turn the spray gun over the dead centre of its pivot from either side of the standard utilizing the momentum of the moving parts of the structure to carry the spray gun over dead centre.

2,496,573. FERTILIZER DISTRIBUTOR. Patent issued February 7, 1950, to William B. Aspinwall, Spokane, Wash. A fertilizer distributor comprising a tubular body having upper and lower longitudinally extending portions, said lower portion having a longitudinally extending bill constituting a trench opener, the upper portion extending rearwardly beyond the rear end of the lower portion and having its rearwardly projecting portion constituting a blade for filling in a trench formed by the bill of the lower portion when the distributor is moved forwardly along the ground, a fertilizer container at the front end of said body open at its rear end for discharge of fertilizer into the body, and a rearwardly tapered member in the body registering with rear end of the container for controlling flow of fertilizer from the container into the body for deposit into a trench formed by the bill.

Trade Mark Applications

TENNESSEE, in capital letters, for basic slag for use as a soil conditioner. Filed Feb. 23, 1949, by Tennessee Coal, Iron and Railroad Co., Birmingham, Ala. Claims use since 1908.

DIWEEVIL, in capital letters, for grain and seed fumigant. Filed Oct. 1, 1948, by Woolfolk Chemical Works, Ltd., Ft. Valley, Ga. Claims use since Aug. 11, 1948.

ISCOMIST, in capital letters, for insecticides, larvicides, fungicides and odorants. Filed Nov. 20, 1948, by Innis, Speiden & Co., New York, N. Y. Claims use since Sept. 15, 1948.

ARATHANE, in slender capital letters, for agricultural acaricides, insecticides and fungicides. Filed Nov. 23, 1948, by Rohm & Haas Co., Philadelphia. Claims use since Oct. 8, 1948.

ESTERON, in heavy capital letters, for weed-killing composition. Filed Oct. 27, 1948, by Dow Chemical Company, Midland, Mich. Claims use since Oct. 1, 1946.

NIATOX, in hand-lettered italic caps and lower case, for insecticidal composi-

tion for use on plants and animals. Filed May 22, 1947, by Food Machinery and Chemical Corporation, San Jose, Calif. Claims use since Oct. 1, 1945.

HYPODEE, in capital letters, with last three letters in italics, for insecticide. Originally filed May 16, 1946, then amended to application under act of 1946, Principal Register, Aug. 4, 1949, by Hydroponic Chemical Co., Inc., Copley, Ohio. Claims use since Mar. 28, 1946.

HYDRONOX, with first and last letters larger than others, for insecticide. Filed July 1, 1948, by The Farnam Company, Omaha, Nebraska. Claims use since Mar. 15, 1948.

USI Gets Patent Rights

U. S. Industrial Chemicals, Inc., has announced its acquisition of foreign rights under pending United States patents covering the synthesis and manufacture of pyrethrin-like chemicals. Corresponding applications have been filed in all major foreign countries by U. S. I., it is stated.

U. S. patents covering the invention were filed by the U.S.D.A. and it was announced that these would be held in the public interest for unrestricted use in the U. S. The prosecution of foreign patents, however, was waived to the inventors, Milton S. Schechter and F. B. La Forge, subject only to certain rights reserved by the federal government. U. S. Industrial Chemicals acquired these foreign patent rights from the inventors for an undisclosed sum.

Anti-Weed Bill for New York

A bill to create a state Weed Control Commission to control ragweed in New York State was introduced in the State Senate in Albany February 16, by Sen. Arthur Wachtel, Bronx. The bill is backed by the Hay Fever Prevention Society of New York.

Chem. "Who's Who" Coming

Leading firms in the chemical and allied industries have been invited to submit nominations from their personnel for inclusion in the forthcoming third edition of the "Chemical Who's Who." Editor of the book is Williams Haynes, 161-163 Water Street, Stonington, Conn., to whom the nominations should go.

Classified Advertising

Rates for classified advertisements are ten cents per word, \$2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, \$1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 234 W. 31st St., New York 1. Closing date: 25th of preceding month.

Positions Open

Chemical Engineer: Wanted by mid-western chemical firm for agricultural and specialty chemical production, supervision and control. Give details of education and experience. Address Box No. 421 care of Agricultural Chemicals.

Agricultural Chemical Salesman: Must be experienced with following in territory. Large, well established line. 5% commission distributor sales, 10% dealer sales. Address Box No. 426 care of Agricultural Chemicals.

Positions Wanted

Agronomist - Plant Physiologist: Ph.D. Background in soil fertility with herbicide and administrative experience. Young, ambitious veteran of World War II, with family, now permanently employed. Desires a position with opportunity for advancement. Address Box No. 422 care of Agricultural Chemicals.

Salesman: Age 39. Offers wide contacts among midwestern buyers of synthetic detergents, alkalies, chlorine and other heavy chemicals. Degree in chemistry from leading engineering school plus practical experience enables me to help solve customer technical problems. Address Box No. 423 care of Agricultural Chemicals.

Chemical Sales: Young man with three years experience in sales of agricultural and industrial chemicals, desires position with manufacturer in chemical or agricultural field. Graduate mid-west college. Best references. For further details, write to Box No. 424 care of Agricultural Chemicals.

Salesman: Four years sales contacts on eastern seaboard selling agricultural, pharmaceutical and specialty chemicals including export sales promotion and manager chemical division of export-import company, seeks new connection preferably in East. College graduate. Full resume of experience and education sent gladly. Immediately available. Address Box No. 425 care of Agricultural Chemicals.

Miscellaneous

Wanted: One 3, 4 or 5-roll high side Raymond Mill complete with whizzer and throw-out. One 6 x 60 Rotary Drier complete with drive. M and M Clays, Inc., McIntyre, Ga.

For Sale: Buffalo Turbine Mist Sprayer—Duster Trailer Model used thirty hours as demonstrator. Perfect condition.—Sacrifice; Make offer—Pest Control Supply Co., 6164 Santa Monica Blvd., Hollywood 38, California.

ALVIN J. COX, Ph.D.

Chemical Engineer and Chemist

(Formerly Director of Science, Government of the Philippine Islands. Retired Chief, Bureau of Chemistry, State of California, Department of Agriculture.)

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Woodrum Lauds Initiative

Clifton A. Woodrum, president of the American Plant Food Council, Washington, D. C., in a talk before the 100-Bushel Corn Club of South Carolina on March 8, told his audience that their achievement of increasing crop yields "is a mass tribute to individual initiative, agricultural education and more efficient farming so essential in the preservation of our private enterprise system."

The meeting, held at the Jefferson Hotel, Columbia, S. C., was attended by 200 persons, including the champion corn growers who were given awards. The meeting was sponsored by the Clemson College Extension Service.

"Honors bestowed today to the winners of the 100-Bushel Corn Club are incidental to the real satisfaction of a job well done," he said, adding that "the more tangible benefits come through the achievements of higher production at lower costs, through more efficient farming and certainly use of fertilizer is one of the most important factors in South Carolina." Low per unit costs of raising any agricultural commodity is in the best traditions of a sound farming economy," he asserted.

Mr. Woodrum stated further that, "farmers long have been regarded as one of the staunchest groups in our private enterprise system," but warned that "Americans, in general, must be on guard constantly against a persistent trend toward centralization of government and the regimentation that invariably follows."

"Let us not be lulled to sleep by rosy promises of the advent of the millenium where there will be 'peace and plenty' free from toil and care," he said. "There is no substitute for hard work and economical living—for these are factors in placing our Nation in the most enviable position in world leadership."

Mr. Woodrum emphasized that "the problems of marketing and distribution offer our agricultural leadership their greatest challenge today." He concluded that "we cannot truly say there is 'surplus food' when there are still hungry mouths to feed."

AGRICULTURAL CHEMICALS

NACA to Atlantic City

The annual spring meeting of the National Agricultural Chemicals Association is scheduled for April 20 and 21 at the Haddon Hall Hotel, Atlantic City, according to Lea S. Hitchner, executive secretary of the association. Mr. Hitchner indicated at press time that the program would consist almost entirely of symposia on subjects of current interest to the trade. Names of discussion leaders were not available for this issue.

It was indicated by the Association that much of the program would comprise matters of interest only to members of the group, but that the meeting would not be a "closed" one in a strict sense.

Short Supplies are Seen

Discussing the insecticide supply situation in a letter to the trade, John Powell & Co. states that there is a tightening of supplies of pyrethrum, sabadilla, DDT and BHC. Pyrethrum inventories continue low, the letter states, and the demand strong. Prices are firm and conditions abroad will not increase import availabilities. Although there has been some progress in "synthetic pyrethrum," these materials cannot be expected to ease the pyrethrum situation in 1950.

"BHC and DDT both moved freely during late 1949, after unusual inventory depletion because of heavy infestations during the summer," the letter reminds. "Thus, no heavy carry-over existed this year. Further, replacement supplies are already being withdrawn; an early opening of the season seems likely." The coal strike has also affected the supply of benzol.

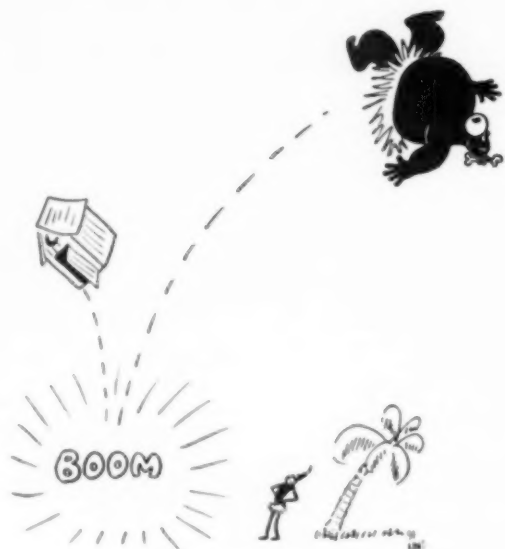
Supplies appear satisfactory in cube, toxaphene, chlordane and 2,4-D, but preliminary withdrawals were recommended; particularly in the case of 2,4-D. Because of weather conditions in 1949, movement of this herbicide was less than anticipated. Thus normal production tapered off and stocks at the year end were smaller than in previous years. With the right kind of weather break, 2,4-D could become a short commodity.

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(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)



"Musta been somethin' he et!"

No Scatteration!

NO "scatteration," but plenty of deep market penetration,—this is what a class journal recently claimed for its advertising effectiveness . . . Just as well-edited business magazines assure better advertising results by concentrating their circulation in special markets and avoiding sprawling all over the map,

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AGRICULTURAL CHEMICALS

254 WEST 31st STREET

NEW YORK 1

TALE ENDS

THE current potato surplus, and the problem it is creating for the government, may be laid at the door of efficient use of agricultural chemicals. Senator Lucas has recently introduced an amendment to the Agricultural Act which would require strict marketing quotas on potatoes. He pointed out that under the present system of acreage allotments only, growers have simply boosted their output per acre by planting rows closer together, using more fertilizer,—and we might add making the most efficient use of agricultural insecticides and fungicides. It has demonstrated that agricultural chemicals can boost agricultural output,—but it's been rather costly to the taxpayers.

Jack R. W. Wilson, Stockton, Calif., tells *Agricultural Chemicals* that the brief note in January's issue about his offering a booklet on the "ABC of IPC," has brought scores of requests from half of the states. "These come from manufacturers, applicators, librarians, Exp. Stations, USDA bureaus and divisions, and from commercial firms," he says.

Toxaphene does it again! Recently a Hercules Powder sales group went to Africa, among them Richard J. Both. He is the bird who pulled the neat trick of being in Monrovia, West Africa—stranded by plane engine trouble—and phoning his wife from Trenton, N. J., to their home near Wilmington, Del. It was not done with mirrors, but via a "ham" radio operator in Trenton who was a friend of a friend of a former head of Liberian Airlines whom Mr. Both met in Monrovia. The airlines former exec in Africa contacted his pal in Trenton—and zip, bango—the amazed Mrs. Both was on the phone talking to her husband in Africa. She insists they did not discuss Toxaphene. He said that they had engine trouble over Dakar, were waiting for a new engine at Monrovia, but would soon be off for South Africa, Egypt, and Rhodesia. These Toxaphene guys get around—and how!

AGRICULTURAL CHEMICALS



Dusting cotton with 5-nozzle, engine-powered duster.
Photo courtesy U.S.D.A.

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PENCO COTTON INSECTICIDES ARE GOOD NEWS FOR GROWERS

These new powerful insecticides give you valuable weapons against a wide variety of cotton pests—including the toughest of them all, the *boll weevil* . . . and in the Southwest areas the Lygus and stink bugs.

Mixers and Compounders! When you deal with Pennsalt, you are dealing *directly* with a *basic* producer. Pennsalt offers one of the *most complete* lines of cotton insecticides available from a *single source*:

PENCO BHC Materials

PENCO DDT and Toxaphene Concentrates

PENCO Calcium Arsenate

... plus **PENCAL**—the neutral-type calcium arsenate which can be mixed with certain organics for overall control. **PENCAL** was amazingly successful on thousands of acres last year.

Remember, Pennsalt's complete line of cotton insecticides is backed by 100 years of experience in chemical manufacturing. That means guaranteed *high quality* at *low cost* to you, with *speedy delivery* from nearby warehouses. Our technical representatives are always at your service. Just call or write: Agricultural Chemicals



Department, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.; Tacoma, Washington; Bryan, Texas; Los Angeles, California; Portland, Oregon.

BUT don't wait too long—(before ordering)

PENCO COTTON INSECTICIDES:

BHC—PENCO® BHC Technical (36% gamma isomer)
PENCO BHC D-12 dust concentrate (12% gamma isomer)
DDT—PENCO BB-50 dust base (50% DDT)
PENTECH® A (micron-sized technical DDT)
PENTECH M (newly improved technical DDT)

Toxaphene

Toxaphene concentrates and formulations.

Calcium Arsenates

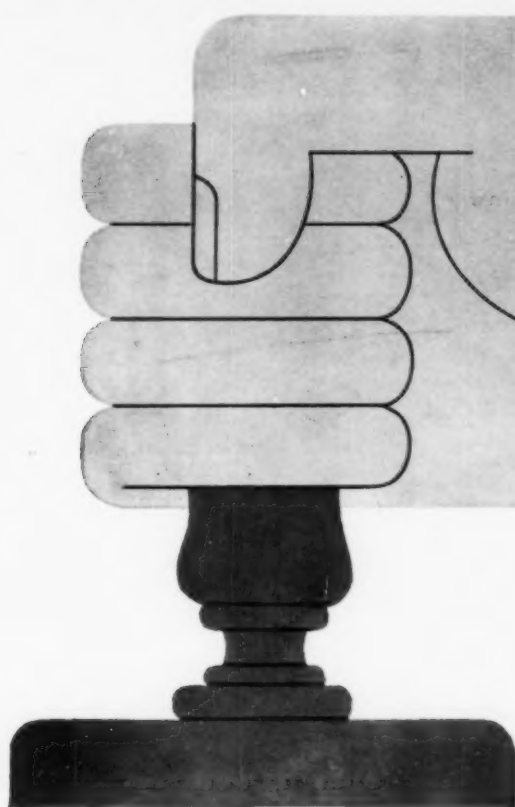
PENCAL (new, neutral-type calcium arsenate)
PENCO Calcium Arsenate (regular)

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PENN SALT

agricultural chemicals

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NX50-6